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ORIGINAL COMMUNICATIONS.

EXTERNAL USE OF ADRENALIN IN NEURALGIA, NEURITIS, AND REFLEX OR REFERRED PAIN.[1]

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Over 500 records of cases have been sent me by physicians since the publication of my first paper in *American Medicine*, on the above subject, February 24, 1906. I have also a large number of reports by intelligent laymen who corresponded with me on the subject, and either tried the treatment on themselves or some member of their family. I requested a physician's presence at these trials, not because of any possible danger, but that the physician might judge, in case of failure, what the concurrent conditions were—failures being as useful as successes in determining the value of the treatment.

The field being extensive and constantly broadening, subdivision is necessary, and before citing the selected reports I will present for consideration certain phenomena noted therein, irreconcilable with present views of the physiologic action of the suprarenal secretion. The manufacturers also put up a 1:1000 solution, which is not nearly so convenient of application in neural cases. This explanation is made necessary by the large number of requests for the formula for making an ointment containing the suprarenal principle.

1. The only absolute failures noted were of neuralgias springing from toxic conditions, such as intestinal toxemia, the malarial plasmodium in the blood, diabetic and saturnine poison; also some arising from reflex irritation from traumatic or inflammatory lesion of a branch of the same nerve (*e.g.*, a supraorbital neuralgia arising from a violent iritis); also neuralgias and neurites arising from degenerative conditions, as in certain stages of tabes dorsalis and of adiposis dolorosa, especially the former, are refractory in the extreme. There are relievable cases of neural pain from toxic conditions, as those from gout and rheumatism, and these will be discussed.

2. The unvarying successes were of functional neuralgia and neuritis. These comprised neuralgias of all branches of the fifth nerve; neural disorders of the intercostal, cervico-occipital, cervicobrachial nerves; dorsal and lumbar exogenous nerve roots; musculospiral, auriculotemporal, coccygeal, sacral plexus, palmar and plantar; the great sciatic and its extensions; long and short saphenous nerves. The neurites were of the sciatic and its extensions; the palmar and plantar nerves; and several exogenous nerve roots of the dorsal and lumbar vertebras, and postoperative neuromata.

Under certain neural conditions not as yet clearly defined, and in recurrent cases of long standing, also in most neurites, recurrences were noticed in from seven hours to

[1] The Editor has received a number of personal communications indorsing the statements made as to the value of adrenalin for the relief of pain as suggested in this article. He has also received other communications stating that it had signally failed to be of service. This article, compiled by a layman, but personally indorsed by a number of qualified practitioners, is therefore published in order that the facts concerning this important subject may be definitely determined.

ten days, but these yielded again to treatment; the interval between attacks became longer and the attacks less violent, till they ceased altogether. Excellent examples of this phenomenon in neuritis are shown in the two cases of sciatica reported by Dr. Charles S. Potts, chief of clinic of nervous diseases, University of Pennsylvania Hospital, and also neurologist of the Philadelphia General Hospital. Generally, however, the length of time before a recurrence, after one treatment by an external application of adrenalin, is a surprise alike to practitioner and patient. Several of these are detailed below. The only explanation which can fit these cases is that adrenalin brings about regeneration of the diseased or exhausted nerve. I present below a group of phenomena leading to the conclusion that regeneration of neural energy and endurance is at least one of the functions of the suprarenal secretion. These phenomena occur with too great regularity to be carelessly regarded.

The specific action of adrenalin in functional neuralgia and neuritis is so unvarying that its failure to relieve may be accepted as diagnostic of reflex neuralgia, or a referred pain, indicating the presence of some perhaps yet unknown morbid condition. True, there are occasional recurrences in functional neuralgia and neuritis of long standing, but they are markedly less violent than the original attack, yield promptly to treatment by adrenalin, and this is followed by a much longer interval of immunity. When the nerve degeneration has progressed too far, neuritis will show briefer periods of relief, as in the case of tic reported by Dr. Morris Booth Miller, professor of surgery at the Polyclinic and Postgraduate Hospital, Philadelphia, and the cases of sciatica of Dr. Potts already mentioned, or perhaps still show plainly, in the pains of tabes, after unmistakable signs of degeneration have set in. In this, however, luetic poison may play a part, if the theory is correct that it is usually associated with spinal cord sclerosis, and those cases of tabes in which adrenalin has been reported as giving relief may have been non-luetic.

Besides the neuralgias and neurites above mentioned, unvaryingly favorable reports have been sent respecting the external use of adrenalin in achillodynia (two cases), twitching of the orbital muscles from eye-strain (three cases), vaginismus (three cases), herpes zoster (four cases), lumbago (nine cases), metrodynia (two cases), one treated by uterine suppository containing three minims adrenalin ointment, one by sacral inunction (three minims on each side).

3. Reflex neuralgias of great severity are commonly relieved for periods varying from a few hours to several months. The most common of these are derived from eye-strain and dental caries. The former usually manifests itself in the supraorbital nerve, the supratrochlear, infratrochlear, and frontal rami being also involved, besides often the cervico-occipital and occipital rami of the second cervical. Frequently it is bilateral, the pain being greatest on the side with the most refractional error. When first treated it will be relieved often for several months. Then will come a fierce recurrence, which cannot be relieved except for perhaps less than an hour. In the first case the regeneration or rejuvenation of the nerve has given it greater endurance, and freedom from pain has encouraged into the patient further outrages upon the eyes, till some violent and unquellable recurrence induces a visit to a competent refractionist. The relief from pain has nothing to do with its exciting cause, as the sequel will show. Diagnosis is here made easy, not only by the above signs, but by the unrelieved ache in the eyeball itself. Reflex neuralgia from dental caries follows the same rule. It usually involves both temporal and malar branches of the superior maxillary nerve, when the caries is in the upper jaw, and the dental and labial when in the lower—pain often centering at the mental foramen. This form is invariably on the side of the affected tooth, though an extra caries may make it bilateral. Mandibular caries, or

acute or chronic periostitis, will give rise to a similar reflex. When the cheek swells from toothache, it is usually from reflex malar neuralgia. Two minims of adrenalin ointment smeared in a semicircle just bordering the parotid gland will relieve the malar neuralgia in three or four minutes, and cause the edema to disappear in about five hours. Often the ache in the tooth itself is so insignificant as not to be felt till after the reflex neuralgia has gone. I made this discovery at Swiftwater, calling Dr. Slee's attention to it, and at once communicated it to others, soon getting reports of cases enough to show the truth of my theory. The cases in which severe pain persisted in the tooth were proved to be from an ulcerated tooth in a closed cavity, no relief being possible till the pressure of gas on the intradental nerve was removed. Reflex otalgia is generally from middle-ear disease, or of the mastoid process. The late Dr. Eduardo Andrade, of Jacksonville, Fla., reported to me last April the case of a well-known resident there who suffered for several years with prostrating attacks of otalgia from otitis mastoidea. Once when morphine failed he gave adrenalin solution 1:1000, putting one drop far down in the ear. Relief came in two and a half minutes. Recurrence came in about a month, and again adrenalin relieved. A third attack found adrenalin ineffective, and morphine was resorted to, with only partial success. Subsequently he used adrenalin ointment, with better results.

The case of reflex neuralgia centered at the mental foramen, reported to me by Dr. Sollace Mitchell, Jacksonville, had complete relief for three weeks from external application of adrenalin ointment. The pain then recurred violently in the temporomalar, and again yielded to adrenalin ointment. A recurrence came in about two weeks more, in the first branch affected, but refused to yield. This case is interesting from the fact that it shows nerve regeneration to have resisted attack in the branch of the inferior maxillary affected first and treated, then recurred in a branch of the superior maxillary, then finally in the same branch of the inferior maxillary. The reflex in this case cannot be from dental caries, as the patient, past eighty, has no teeth, but reflex neuralgia it undoubtedly is.

There have been many neuralgias reported to me by physicians in which adrenalin ointment gave relief for periods varying from a few hours to several weeks, but although they bore the earmarks of reflex in the comparatively short remission and the ferocity of recurrence, there were no data given of concurrent conditions which could determine the classification, or make the cases available for study. Others have omitted to mention the nerve involved, or the quantity of ointment used. One reported complete failure in the case of a "neuralgic headache" in spite of the administration of 25 minims of adrenalin solution by mouth and two drachms by "injection" within two hours. A sphygmomanometric record of this case would have been interesting.

4. "Transferred" pains, so finely described and mapped by Dana and others, are easily relieved by this treatment, but are subject to the same rules of recurrence as reflex neuralgia, depending on the extent of the causative lesion. Adrenalin is an excellent aid to diagnosis, for when the "transferred" pain is checked, the lesser pain near or at the causative lesion is usually made perceptible, and diagnosis made easy. I gave my opinion last April to a friend whose wife, neither gouty nor neurasthenic, had a violently recurrent achillodynia, that the slight pain she felt in the right groin during the periods of relief given by adrenalin were indications that the trouble was ovarian—and that the transferred pain in the heel confirmed this. Her medical adviser pooh-poohed this. He saw her—I had only my friend's letters to guide me, plus a fair knowledge of Dana and Butler's works. The physician was sure it was a subacute appendicitis. Last summer he must have suddenly changed his mind, for his patient underwent an oöphorectomy at St. Luke's Hospital, New York City, and an ovarian

neoplasm was removed. There has been no achillodynia since. Some transferred pains are obstinate till application is made over the nerve efferent from the seat of trouble. A good example of this was a severely painful spot on the inner side of one knee. The physician found that it would yield but slightly to local application of two minims of adrenalin ointment. I advised smearing three minims over the course of the anterior saphenous nerve. He began with the anterior crural nerve, continuing down the saphenous to the entrance to Hunter's canal. The knee pain stopped in three minutes, and did not recur for three weeks. Later, a tuberculous hip-joint was operated upon, and there has yet been no return of the transferred pain. This field will, I am sure, require many years of careful work to map, but its diagnostic value is great.

5. The pains of gout, articular and muscular rheumatism, myalgia, and of at least some trauma, are relieved almost entirely by adrenalin, applied externally. I tried it in one rheumatic case (arthritis deformans) over a year ago, and it gave perfect relief for about ten hours after each application, without increase, but I withheld it from my report because of the doubt in diagnosis, there having been attacks of sciatica and neuralgia before and concurrent with the rheumatic attack, and there was a sufficiency of incredible truth in my report as it was. But it is now a certainty. One case, arthritis (knee-joint), has been kept free from pain all night for now nine weeks at the University of Pennsylvania Hospital. Two minims (0.12 Cc.) of adrenalin ointment is smeared around the leg, about one inch above the upper edge of the patella, when the resident in charge of the ward makes his evening round. This was my suggestion, the object being to intersect both popliteal nerves; the long and short saphenous and fibular cutaneous nerves are involved by such an attack. Cases of gout are in the reports given below. I tried one minim smeared down each side of the first, second, and third cervicals one inch from the median line, when my nurse at the University Hospital, a graduate from the Blockley school, reported for duty suffering from a severe cervical myalgia from cold. Entire relief was given in four minutes, only a slight muscular soreness remaining. There was no recurrence. I reported this to a number of friends. Mr. T. B. Donaldson, secretary of the Alumni Association, University of Pennsylvania, at once tried it on one of his printers, who had been blistering and using liniment for several days without relief, and got immediate and permanent results. Three physicians of record, modestly desiring their names shall be withheld (like the resident of the University of Pennsylvania who has the arthritis case in charge), have reported similar successes in myalgia from cold, and one in a case of muscular rheumatism. No failures reported yet.

The relief of pain in three cases of myalgia is in itself of slight importance, but of considerable neural and pathologic significance. In rheumatic and gouty conditions there is, of course, no direct remedial effect produced by adrenalin, but the relief of the pain must be a considerable factor in maintaining the patient's strength and aiding recovery by conserving the heart's action, and keeping down temperature. This field is one of great promise.

I now pass to a brief presentment of certain phenomena so frequently to be observed in using preparations of adrenalin as to make their significance vivid when correlated.

1. The quantity of adrenalin necessary to relieve neuralgia, or neuritis (including affections of the deeper nerves, like the sciatic), is too small to cause the slightest ischemia, or variation of blood-pressure.

2. There is a decided regeneration of the nerve and its branches, after treatment, rendering it less liable to recurrence of an attack, though predisposing conditions continue or return. I have complete reports of cases 1, 18, and 19 to December 1, November 15, and December 10 respectively, described in my paper published in *American Medicine* of February 24, 1906. No. 1,

with a history of prostrating attacks of unilateral supraorbital and infraorbital neuralgia extending back several years, was treated September 13, 1903, during a severe attack, by external application of five drops of adrenalin chloride solution, diluted with ten drops of water. The pain left in three and one-half minutes, and with the exception of two or three vague touches there had been no recurrence up to December 1, when her husband wrote me from Halifax asking me to send him something for his "eye headache"—a unilateral probably neuralgic from cold. Case 18 in the paper referred to, a woman of thirty, with a long history of constant overwork, lack of proper amount of sleep, badly nourished, and with the typical facies of acromegaly, and complaining for a long time of pain in the left iliac region, had had a number of severe attacks of trigeminal neuralgia, lasting sometimes a week. During most of these attacks work was impossible. September 15, during a severe attack which had cost an entire night's rest, I applied one minim (0.06 Cc.) of adrenalin ointment, smearing it from the temporomalar branch to the supraorbital foramen. The pain departed in three minutes and thirty-five seconds, and up to November 15, 1906, there has not been the slightest recurrence, though her general health has been far from good, and neurasthenic conditions are more conspicuous. Case 19 had a history of long overwork and loss of rest, from nursing a relative, with conditions aggravated by, or reflex from, a metropathic disorder. The neurotic symptoms were general debility, aphonia, almost complete paraplegia, and neuritis of three exogenous nerve roots in the dorsal vertebras. Concurrent with these were anorexia, and persistent insomnia not yielding easily or long to hypnotics. Pain from the lumbar neuritis had been constant for twenty months. September 18, 1905, by consent of her physician, one minim of adrenalin ointment (0.06 Cc.) was applied to each painful spot on the lumbar vertebras. Pain ceased within five minutes. Within a week patient recovered her voice, began to sleep without hypnotics, appetite and strength returned, she walked alone within a fortnight, and although still a great sufferer from the internal trouble, had no return of the neuritis up to November 15, when a grave recrudescence of the internal trouble sent her again to the sanatorium, where at last accounts she was about to undergo an operation.

I have records of nearly a hundred cases in which one application of adrenalin ointment has caused a previously frequently recurrent facial neuralgia, functional or reflex, to cease troubling for periods of from one month to six, and recurrences, reflex from perhaps the same lesion, came in some other nerve than the one afflicted before.

These are irrefutable proofs of nerve regeneration caused by adrenalin.

3. Phenomena attending intravenous administration of adrenalin differ from those following administration by hypodermoclysis or mouth or clyster or hypodermic in the tissues, not only in the rapidity of action, but in the fact that at first there is an upward bound in pressure, with increased frequency, followed by a decided slowing of the pulse without decrease of the augmented pressure, and this again is followed by another staccato gain of tension, reaching the highest point in about three minutes after the first sign of the effect of the injection could be observed. By hypodermoclysis the effect shows an increase of pressure by far less steep gradient, with no second increase. By mouth the first effect is often a marked slowing of the pulse before any tension can be observed, and the pressure-rise is far slower. Intramuscular injection resembles hypodermoclysis in its effect.

These effects are purely neural. When given intravenously the blood-pressure is raised first by stimulation of the intracardiac ganglia lying between the ventricles and auricles. This is shortly followed by retardation as the vagus begins to respond. Then after a brief interval of from a half to a full minute or more comes a decided increase of pressure, caused by the vasomotor chief center and subsidiary centers

in the spinal cord coming into action and creating a general contraction of all the arterioles to greater or less degree, according to the quantity of adrenalin administered.

4. Ischemia simply results from local stimulation of the vasomotor nerve rami in the arterioles immediately within range of the applied adrenalin, causing contraction of the unstriated muscular fibers of the tunica media. The statement of most therapists that the suprarenal principle "stimulates the muscular fibers in blood-vessel walls" is neither correct nor in accord with the brilliant results of the experiments of the great group headed by Brown-Séquard, Tholozán, and Lombard, to whom present knowledge of the vasomotor system is entirely due. The constriction of the arterioles and capillaries when a preparation of adrenalin is liberally applied to skin or mucosa is directly due to its effect upon the vasomotor fibrils with which the tunica media of the arterioles is known to be bountifully supplied.

5. The amount of adrenalin necessary to influence the vasomotor nerves is much greater than that necessary to cure a neuralgia or neuritis, or relieve a reflex or transferred pain. And the amount necessary to influence a sensory nerve by producing anesthesia is slightly greater than necessary to affect the vasomotor rami locally. I have repeatedly relieved or cured (according to whether it was functional or reflex) a severe neuralgia, affecting several branches of the fifth cranial, by applying one minim of adrenalin ointment to the supraorbital foramen, and smearing it over a surface one inch in diameter to facilitate absorption. To produce an ischemia on the same subject six and a half minims were necessary, and to add local anesthesia beyond that naturally consequent upon emptying the blood-vessel at least double that quantity was required.

6. When several branches of the same nerve are neuralgic, the application of adrenalin to one will usually relieve all—*e.g.*, the supraorbital, temporomalar, frontal, mental, and supratrochlear nerves being involved, one minim of adrenalin ointment smeared over the supraorbital foramen only will relieve the pain in all, unless, as before said, the case is toxic in origin. *Per contra,* if the cervico-occipital is also involved, it will not be affected till directly treated.

7. If two or more nerves are involved, originating from different ganglions (*e.g.*, the Gasserian and Meckel's), each will require treatment. There are a few exceptions reported, but the rule generally obtains.

8. While a neuralgia is being relieved by a quantity of adrenalin too small to cause ischemia, the esthesiometer will prove that the tactile sense is unchanged. If anything, it is more delicate after the neuralgia disappears, but this is because the pain distracts attention from the lighter sensation. This disproves the idea so many have expressed to me that the relief is due to anesthesia.

9. I have several times stopped a twitching of the muscles about the eye (orbicularis palpebrarum, and frontalis) resulting from eye-strain, but unaccompanied by any pain, by applying one minim of adrenalin ointment to the palpebral nerves (inferior), though the twitching was all above. These nerves being distinctly motor, and the particular rami being away from the apparent seat of trouble, is another instance of phenomenon numbered 7.

10. The relief of muscular rheumatism, myalgia in the cervical region, or lumbago, taking not over five minutes in the cases now reported, was found in the three tested to be unaccompanied by the slightest loss of tactile sensibility, from the time of application till the pain was entirely gone. Two and a half minims was the largest amount used in any one case—adrenalin ointment in eight cases, adrenalin ointment in two, adrenalin ointment in one. No failures reported.

11. The relief of the angioneurosis of hay-fever can be accomplished more swiftly by smearing one or two minims of ointment containing 1:1000 of adrenalin between the brows and half-way down each side of the nose than by the inunction and spraying of the nasal mucosa, as now in vogue, and

there will be none of that "drawn feeling" of which many complain, due to the ischemia produced by the larger quantity generally employed. The effect in this latter treatment is to allay the irritation of the supraorbital, supratrochlear, and infratrochlear and frontal nerves, and the superior and inferior nasal, the nasal rami of the superior maxillary, and the nasopalatine nerves, all of which are involved in a severe attack. Those rami in the posterior nares which may be affected will be relieved simultaneously, exactly as all branches of the supraorbital affected in a supraorbital neuralgia are relieved when an application of adrenalin ointment is applied only to the supraorbital foramen.

12. The impression that the relief of hemorrhoids from a rectal injection of adrenalin is due to vasoconstriction is absurdly erroneous to any one remembering the pathology of the affection, and the proof that it is entirely due to the effect of adrenalin upon the nerves with which the anus, rectum, and sigmoid flexure are so bountifully supplied is afforded by the effect of about three minims smeared about the anus, upon a surface three inches in diameter. This amount will not produce any ischemia, but will within four minutes allay the reflex irritation of the rami of the inferior hemorrhoidal nerve, the anal rami of the perineal and anococcygeal nerves, which caused reflex contraction of the sphincter and adjacent muscles, occluding the vein. Where the hemorrhoid is due to hepatic pressure upon the portal vein there will be no relief by either method, but in those cases arising from irritation of the neural plexus of the colon and sigmoid by dejecta or salines, or the scybala of habitual constipation, its action is prompt, but the evil will, of course, recur if the cause is repeated.

13. The relief of asthma by adrenalin is not limited to the variety arising from reflex irritation of the vagus. It is supposed that in some mysterious way the vasoconstricting power of the adrenalin preparation, sprayed upon the mucosa of the nose, reaches the affected muscles and allays the spasm. Yet it is recognized that bronchial asthma is distinctly neurotic. In many cases nasal spraying with adrenalin does relieve, but only when the solution runs down the posterior nares and comes in contact with the pharyngeal mucosa, well supplied with rami of the vagus (pharyngeal branches), with communicating fibers of the spinal accessory and sympathetic, and within easy distance of the ganglion of the trunk of the pneumogastric and of the pharyngeal plexus, which communicates with the coronary and both deep and superficial cardiac plexuses, with their ganglionic enlargements, the connection of the sympathetic being through the so-called sympathetic cord. This appears to explain clearly why a few drops of adrenalin solution poured into the mouth and allowed to trickle back to the pharynx will have as prompt and powerful stimulating effect on the heart as injection into one of the large veins, if at all exceeded by the latter. Of course relief may also be thus given to cardiac asthma, but the accompanying danger to sclerosed or atheromatous blood-vessels from a sudden rise in blood-pressure makes this method of stimulating the heart inadvisable, unless circumstances demand the risk.

Taken singly, these phenomena mean little, but when they appear in heterogeneous and unrelated cases their significance becomes important, and these deductions flow consistently:

1. That the function of the suprarenal glands is to supply or stimulate the function producing the substances consumed in nerve cells, in the discharge of potential activity—whether this be only the Nissl granules or also Robin's myelocytes and the intercellular gray and granular matter.

2. That upon occasion arising it can be supplied to the intracardiac ganglia (vasomotor) in an abnormal quantity capable of stimulating their activity even though the central vasomotor cells be inactive, through syncope, or profound shock, or like condition, and maintaining cardiac action for

some time independently of impulse from cerebral nerve cells.

3. That the fact that the intracardiac ganglia lie between the auricles and ventricles, that the upper vena cava ascendens is also supplied with contractile fibers and with vasomotor ganglia (and is capable under vasomotor stimulation of rhythmic contractions like those of peristalsis), viewed with the further fact that the suprarenals discharge their secretion into the vena cava within three seconds at normal rate of flow of the right auricle, seems to be direct provision for the above named emergency, and explains the ceaseless energy of the heart.

4. That its restocking the nerve cell with kinetoplasm explains the long periods of intermission between neuralgic attacks, and emphasizes the old saying that "neuralgia is the cry of a starved nerve."

The fact that the suprarenals are supplied with branch nerves from the semilunar ganglia, the phrenic, the pneumogastric, and the renal plexus, and have at least two ganglia close to the central vein, has a significant bearing on this view.

Small quantities of adrenalin (*i.e.*, the amount absorbed from an external application of less than two minims of an ointment containing 1:1000) will cause the regeneration of a neuralgic nerve lasting for periods of from three months to three years, as shown in the cases cited. This confirms the hypothesis that its action in small doses is to renew or cause renewal of the kinetoplasm, which acts like electrolyte added to a primary battery which is nearly exhausted—first raising the voltage and amperage to full normal output, then merely storing up ampere hours. Large amounts of adrenalin, however, are capable of direct stimulation of the vasomotor centers, as shown. This is undoubtedly one of nature's provisions for emergency, and particularly shown in the multiplex discharge conduits, conveying the suprarenal secretion into the inferior vena cava, near the part furnished with vasomotor ganglia and a contractile middle coat, and in the provision of the heart with a chain of such ganglia between auricles and ventricles, to be stocked with kinetoplasm if a small quantity be supplied, or be both stimulated and restocked if a larger supply of the suprarenal secretion be poured into the blood. That the motor nerves are also subject to the same laws of influence by adrenalin is unquestionable. I have many times stopped clonic choreic spasm in the calf and foot of a paralyzed leg by applying one minim of adrenalin ointment to the course of the sciatic nerve, either just below the gluteal fold or at the sciatic notch. There was no pain, but frequently recurrent movements showing the motor cells of the sciatic were alone involved. Other involuntary movements, purely motor, have been relieved in the same manner. I call attention to the case reported by Dr. Walter Reynolds illustrating this, and another case he reports illustrating the effect of adrenalin upon the inhibitory rami of the vagus—the action being primarily on the recurrent laryngeal, produced by one-third minim of adrenalin smeared down the center of the windpipe. This experiment showed first a decided stimulation of the vasodilating nerves. The influence of adrenalin is thus shown to include every branch of the nervous system—motor, sensory, and sympathetic—stimulating only when in excessive amounts, but restocking with kinetoplasm, and bringing about regeneration and repair where needed, subject to failure only when destructive degeneration has progressed too far, as in the cases of tabes cited; and failing to relieve the symptom called pain only when vicious toxic or destructive processes make that impossible.

Dr. Charles S. Potts (chief of clinic of nervous diseases, University of Pennsylvania Hospital, and neurologist to the Philadelphia General Hospital) reports: "Last spring I tried an ointment containing 1:1000 of adrenalin in a case of sciatica which had been chronic for about a year. Patient was a barkeeper, aged forty-six, who had been a free drinker at times; could not walk upright, or without great pain, nor sleep except for brief intervals, even under hypnotics allowable in such a chronic case. Achilles reflex absent, knee-jerk present.

Had resorted to all modern methods without improvement in his condition. Last February I had my attention called to the article in *American Medicine* of February 24, 1906, and tried adrenalin ointment, applying two or three minims over the course of the sciatic, from where it comes from under the gluteal fold, and for about three inches down, and about as much from the sciatic notch upward. The effect was certainly uncanny. The pain ceased entirely in four or five minutes, and the man sank almost at once into a deep sleep, which lasted between five and six hours—something he had not done for some months. The pain recurred next day, but disappeared when the treatment was repeated. After a week or so the recurrences came at longer intervals and were less painful, the contractures in the leg lessened, he could straighten up and walk without pain, and was finally discharged from the University Hospital and returned to work, promising to let me know if he ever had a recurrence. I have not heard from him since. Nothing was used with the adrenalin ointment, as I wished to test fully its action in this case.

"On my return from my summer trip another case of sciatica presented at the Philadelphia General Hospital, in a man about fifty. He had been in the hospital about three weeks when I saw him on October 13; had had acute sciatica since April. Examination showed no Achilles jerk; pain and contractures made elevating the affected leg, unflexed, impossible. The usual measures failed entirely to relieve, and the patient found walking painful and difficult and the erect position impossible. I asked Dr. J. W. McConnell, who had his case in charge, to apply about 1½ minims of adrenalin ointment to the sciatic path, beginning at the gluteal fold and thence downward about four inches. He did so, and pain stopped within, possibly, two minutes. Applications were renewed as recurrences came, and the patient was discharged as cured October 23, promising to return in a month and see me at the clinic. I saw him November 11, and made careful examination; found Achilles jerk completely restored; leg formerly affected could be lifted, unflexed, and rotated, in fact was as useful as ever. No sign of recurrence of the pain since he left the hospital.

"I treated a severe case of trigeminal neuralgia with one minim of the same ointment with complete success in not more than three minutes. I myself was the patient, and can certify there has been no recurrence. I have not personally treated a lumbago, but a student at one of my clinics told me that after hearing Dr. C. K. Mills mention the use of adrenalin in neuralgia, he hurried to the bedside of a friend suffering keenly with lumbago, and rubbed several minims along the course of the pain, giving almost instant and permanent relief.

"Failures were as follows: My mother is afflicted with rheumatoid arthritis and at times has severe pain in the joints; during one of these attacks I tried the adrenalin without any material benefit. We used it in a case of tabes in which the pains were very severe and extended down the arm; no benefit was derived, the ointment being rubbed along the spinal column in the cervical region."

Dr. Morris Booth Miller (professor of surgery in the Philadelphia Polyclinic and Postgraduate School) states: "The note I have on adrenalin is very unsatisfactory because, like many such patients, the man did not return to me after the first time. He was a German of about forty-five, with right-sided tic-douloureux affecting the second and third branches of the fifth nerve. He had undergone two operations, but apparently they were only avulsions, and the pain had recurred. I saw him while in pain, and after examining him I sent him home while I thought over the question whether to attack the nerves at their exit first or go straight for the Gasserian ganglion. In the meantime I instructed him to use adrenalin ointment. In a day or two his wife returned to say that his pain was gone and he was again at work. Two or three weeks later she came back to say that he was suffering as much as ever and would call at the clinic,

but I have never seen him. A member of my family used it in some slight neuralgic pains of lithemic origin with success."

Dr. W. Oakley Hermance (formerly on visiting staff, Polyclinic and Postgraduate Hospital, Philadelphia) gives these facts:

"The following notes cover my experience in the treatment of three cases of trifacial neuralgia, one case of sciatica, and two cases of acute gout by the application of adrenalin chloride:

"CASE I.—Adult, aged fifty-four, family history negative. Patient was seized with violent sciatica in the right side of the body. After a progression of four days the sciatic pain became so intense that deep hypodermic injections of morphine and atropine were resorted to, with only temporary relief. The pain finally became so intense that the patient became hysterical, and he stated that unless he was relieved he would attempt his life. At this point I resolved, as an experiment only, to try the use of adrenalin chloride externally, and not being able to secure the adrenalin ointment applied 20 drops of a 1:1000 solution of adrenalin chloride along the course of the sciatic nerve, from its exit upon the thigh to the knee. This application was made at about 10 P.M., and the last previous hypodermic of morphine had been introduced at noon of the same day. I resolved, as a test, to apply the adrenalin solution only as far as the knee, although the pain had been extending to the ankle. Upon visiting the patient the next morning he volunteered the statement that since my visit of the night previous he had suffered no pain except that below the knee, and asked me what I had done the night before to cause the pain in the thigh to disappear. At the time of making the first application I purposely made no mention of what I intended to do either to the patient or the nurse. The disease in this case ran a course of eight weeks, and terminated in perfect recovery, a year having elapsed since that time with no recurrence. At different times I was obliged to repeat the application of adrenalin chloride to relieve the sciatic pain, but after its first application I was not compelled to use opiates in any form. In using the solution of adrenalin it was placed in single drops along the course of the nerve and allowed to dry upon the skin. In the subsequent treatment adrenalin ointment was used.

"In the three cases of trifacial neuralgia, one was of particular interest because of the rapidity with which adrenalin chloride ointment relieved the pain, and because the patient, who had previously been a victim to periodic attacks, has been entirely relieved since the single application of adrenalin chloride, nine months having elapsed since that date and the present time. This case was one of right-sided tic-douloureux, the patient possessing no interesting features as regards family history and previous illnesses, excepting his susceptibility to trifacial neuralgia. He was seized at midnight with a severe paroxysm of neuralgia. I saw him the next day, found him in a highly excited, nervous state, but without doubt in great agony. In this instance, being hurried, I prescribed adrenalin chloride ointment, and directed the patient as to its application, telling him that if not relieved promptly to communicate with me. I saw him the next day, and his statement is that within five minutes after the application of the ointment, to his great surprise the pain subsided, and that by evening the pain had entirely disappeared. The other two cases of trifacial neuralgia are not so interesting. In one of them instantaneous relief was experienced, but the attack recurred within a few days, and it was finally discovered that the cause was a carious tooth. This, of course, made the solution of the question easy, after the removal of the tooth. So far as I know no recurrence of the attack has happened. In three cases relief was not obtained untii several hours after the application of the adrenalin, and I attribute this relief in part to internal treatment, which was administered.

"Of the two cases of gout in which I have used adrenalin externally, one stands out as remarkable. The patient, a woman of fifty-four, having been subject to periodic

gouty attacks, was taken with a most atrocious seizure, the pain being centered in the left great toe. Adrenalin chloride had for the moment escaped my mind, and I applied lead-water and laudanum and gave colchicum and salicylates. I was requested to come to the patient's house again within a few hours, and found the pain even greater; at this time, purposely withholding adrenalin, I gave one-quarter of morphine by the needle, without any apparent relief of the pain. The attack up to this time had been present about twelve hours. Six hours after the injection of morphine had been given I again saw the patient and applied adrenalin chloride, and to her surprise and gratification this intense pain ceased within a period of ten minutes. This patient, however, suffered a recurrence two weeks ago, at this time the wrist of the right hand becoming affected. Adrenalin chloride failed entirely in this instance to relieve the pain, which was only subdued by a deep injection of morphine in the forearm. The remaining case of gouty pain was relieved by applications of adrenalin chloride, but is not so remarkable because the pain was of moderate severity, or the attack evidently not a severe one. My uses up to the present time of adrenalin chloride, when applied in this manner, are confined only to my clinical experience, not having sought for any physiologic reason for its action. Of the cases cited three were most remarkable, the relief occurring, as I have stated, within the short space of ten minutes, and after other well-known resources had failed. I cannot explain the failure of the drug to act favorably in the first case of gout."

Dr. Walter Reynolds (ex-president Atlantic County Medical Society, member American Medical Association, ex-resident physician St. Agnes Hospital, Philadelphia, etc., etc.) writes:

"I wish to report some cases in which adrenalin used externally has given remarkably satisfactory results:

"CASE I.—A lady, aged sixty, ten years ago suffered a severe bruising of the left shoulder from being thrown out of a carriage. For the past five years she has had periodical attacks of neuralgia of the injured arm, mainly in the parts supplied by the musculospiral and ulnar nerves. Various methods of treatment were used in this case, but only partial relief was obtained at any time—a capsule containing acetanilide 2 grains with caffeine ½ grain, and chloroform liniment applied to the back of the hand giving more satisfaction than any other form of treatment until recently. During an attack which had lasted for a week two minims of adrenalin ointment (1:1000) was applied around the arm about an inch below the axilla. The patient had been awakened at 1 A.M. by the pain; in five minutes the pain was entirely relieved, and the patient went back to bed and slept until morning. The next night the pain returned in milder form, and was again relieved in a few minutes by the application of the adrenalin ointment. Since then (two weeks ago) there has been no return of the pain.

"CASE II.—A man, occupation carpenter, had been laid up with sciatica for two months. I directed the application of three minims of adrenalin ointment along the course of the sciatic nerve. The patient was at once entirely relieved and was soon able to return to work. In this case the patient could not tell the exact time required to relieve the pain, but was positive that the effect was gotten in less than half an hour on each occasion. This patient had been treated at first with salicylates and alkalies, later with iodides, but the results were extremely slow as compared with those produced by the adrenalin.

"CASE III.—A man, physician, was troubled with irritation of the ocular muscles, spasmodic twitching, etc., a condition probably due to eye-strain. A single application of ½ minim of the adrenalin ointment over the upper eyelid and about the external canthus of each eye stopped the trouble within five minutes, and there has been no return since—ten days ago.

"CASE IV.—A man had been troubled for several days with laryngitis, causing a dry, annoying cough; the application of one-half minim of the adrenalin ointment over the larynx relieved the cough instantly, and

there was no return of it in the slightest degree.

"CASE V.—Miss C., graduate nurse, had an irritating cough which had existed for two days; a single application of one-half minim adrenalin ointment over the larynx gave immediate relief, without return of the trouble.

"You asked me recently to witness the effect of adrenalin applied externally, your object being to prove that it acts directly upon the nerves. You applied one-third minim adrenalin ointment (1:1000) near your recurrent laryngeal nerve. In one minute after the application your pulse jumped from 68 to 84 beats per minute, with a corresponding decrease in its force. Upon auscultation the heart, previously in good condition, appeared greatly affected, so much so that I felt it necessary to give aromatic spirit of ammonia to overcome the depression. In half an hour, the stimulating effect of the ammonia having disappeared, the pulse-rate fell and the tension went above normal. About a week later the experiment was again tried in my presence. The same amount of adrenalin ointment was applied, with the result that the rate of the pulse changed from 80 to 120 beats per minute, but the constitutional symptoms were not so marked as in the previous experiment."

Dr. Richard Slee (of Pocono Laboratories, Swiftwater, Pa.) makes a brief report of his experience in treating neuralgia and neuritis by inunction with ointment containing one one-thousandth part of the active suprarenal principle:

"1. My first case was one of neuralgia of both supraorbitals, deep-seated pain in the eyeball itself, and dull ache of the rami of the frontal and supratrochlear nerves. I brought the patient to you, to observe your method and time results; you applied about one minim of adrenalin ointment to the supraorbital foramen only, spreading it over an area possibly an inch in diameter. In three minutes and four seconds the patient said the pain was going on the left side (where the application was made), but still remained on the right side. You then remarked that eye-strain was the probable cause—a fact which I very well knew, as the patient was my sister-in-law, and her frequent neuralgias always followed her neglect to wear her glasses, as prescribed by Dr. Gould. In about twenty seconds more the patient said all pain was gone from that side, but persisted on the other, though not so severely, and was confined to the supraorbital. You applied a minim there, and in three minutes and a quarter that trouble ceased. This was done June 14, and up to date, strange to say, although she has constantly violated Dr. Gould's injunction, she has never had a recurrence of the neuralgia. Her nearest approach to an attack was August 16, when she complained to her mother of pains in the scalp, back of the vertex, but it did not last and I did not see her while suffering.

"2. An old patient of mine, stopping at Pocono, sent for me. An attack of sciatica, for which I had treated her for ten years, but without much benefit, had supervened, together with a severe trifacial, involving mainly the temporomalar and frontal rami of the fifth, and bilateral. I applied one minim of adrenalin ointment to the malar, just along the anterior edge of the parotid gland. In about three minutes and one-quarter the neuralgia had entirely disappeared. I then applied one minim to the lower sciatic, from an inch above the fork to about an inch down the popliteals—seat of the most intense pain. Complete relief came in less than three minutes, and there has been no relapse, either sciatic or neuralgic, since. This case bears date in my book of June 28.

"3. Severe unilateral supraorbital neuralgia, relieved in about three minutes by one minim of adrenalin ointment applied over supraorbital foramen; no relapse to date, although weather has been very changeable and often cold, and patient, being in fourth month of pregnancy, not in very good physical condition. This case bears date July 2.

"4. Trigeminal neuralgia, involving temporomalar, anterior dental, malar, and rami of the labial; cheek quite edematous; chief

seat of pain being in malar, and had been progressing four days when I saw patient. Obvious cause was an exposed nerve in the third molar, upper, though patient felt no pain in that. Applied one and one-half minims to the malar, anterior to the parotid gland, where greatest pain centered, and one-half minim to mental foramen. Complete relief of neuralgia in a little over three minutes. The pain in the molar was now perceptible. I told the patient to come back in four hours. She did so, and showed no edema, proving that to have been entirely due to the reflex neuralgic condition, and not to the tooth, which still ached dully and was still untreated. I applied an obtundent to the tooth to relieve, pending a visit next day to her dentist. I consider this an interesting case.

"5. Neuritis of exogenous fibers, third dorsal, bilateral. Had been gradually increasing in severity for about two weeks, with varying intensity of pain, but no complete remission. Had no lack of pupilary reflex, no irregularity of coördination or lightning pains. I applied one minim of adrenalin ointment to each side; all pain left within three minutes, and though five weeks have passed there has been no recurrence. This case may have been incipient tabes, and I am keeping in touch with it.

"6. Neuralgia of anterior dorsal and short saphenous; pain most intense along outer edge of left foot. One minim at a point just below the malleolus relieved in three minutes. No return yet—about three weeks.

"7. Neuralgia of supraorbital, unilateral, involving frontal rami. One minim of adrenalin ointment, applied over supraorbital foramen only, afforded complete relief in three minutes.

"8. Incipient tabes, as diagnosed by a New York specialist; incoördination apparent in gait; complained of severe pain in anterior plantar. Had no chance to examine for nerve-root inflammation, as he was leaving for town, but two applications of one minim each along the affected plantar gave no relief.

"9. Five different applications to the supraorbital foramen, in attacks of neuralgia to which I am subject, about the second day of a recurrent intestinal toxemia, failed to relieve; but—

"10. In a severe neuralgia of that same nerve, clearly due to a cold and damp drive at night and unaccompanied by the slightest sign of intestinal or gastric derangement, one minim of adrenalin ointment gave perfect relief in about three minutes. The results in this and the case above are in exact accord with what you say of the conditions under which your discovery will prove ineffective or be a specific.

"11. Trifacial, most severe in supraorbital; treated exactly as in above case, with prompt and entire relief.

"12. Frontal neuralgia from unquestionable eye-strain, patient having broken her glasses several days before, and not refraining from reading. One minim of adrenalin ointment over supraorbital foramen dissipated the neuralgia completely from all the branches of the fifth, leaving only a dull intraocular ache, probably from the ophthalmic and ciliary nerves. This persisted for some hours, but the patient said it was as nothing to what she had been suffering.

"These few cases from my summer practice have convinced me that there is a hitherto unrecognized physiologic power in the suprarenal secretion, shown clearly by its action in the above cases to be especially directed to nerve repair, and of supreme value in the neural therapy, and I confess to having my usual skepticism entirely removed. As you say, the therapists have not been out of line, but they have only taken notice of its action (in large doses) upon one set of nerves, the vasomotor, failing in some mysterious way to discover the value of its physiologic action in much smaller quantities upon functional and sympathetic affections of the afferent nervous system, with its accompanying tortures."

H. F. Greaney (graduate nurse, vice-president Pennsylvania State Association of Graduate Nurses) reports on behalf of a patient as follows:

"My patient desires me to thank you for his remarkable relief from pain during his

past four successive attacks of gout by the use of your discovery. My attention was first drawn to it by a physician in Philadelphia (a close friend for years of the patient), with whom I had just called on you at the University of Pennsylvania Hospital. On returning to his office the physician gave me a tube of adrenalin ointment, 1:1000, and asked me to try it at the first opportunity. You had explained to me the method of use. This was early last November. Shortly after this the patient had an attack, three joints being involved and the pain being intense. As a trial I treated one limb just above the swelling with two minims of the ointment, smeared on. The pain in that joint stopped in exactly one minute. Shortly after the patient's attending physician arrived, and I told him of the experiment and of its success, and asked if I could show him by trying on the still painful joints. He consented, and the same result came again in one minute. There was no recurrence of pain until the next day, and a second application ended it. In the second and third attacks the results were the same, relief coming, perhaps, a minute more slowly—two minutes in all. In the third attack a sharp sciatica developed, including sciatic nerve and tibials, which was relieved in two minutes by smearing two minims adrenalin ointment, 1:1000, down the course of the sciatic nerve from gluteal fold, and one minim on inner side of affected ankle. In the fourth attack one wrist resisted the treatment for a while, but both ankles yielded as usual. I have nursed this patient through sixteen years of gout, and he always suffered agony before. The relief to the heart was marked.

"I myself used one-half minim of the ointment one day, as you suggested, to relieve pain in heart, throat, and left arm, a few days after an attack of angina, applied along upper edge of collar-bone two inches from left carotid artery. The pain stopped in heart, throat, and arm in one second, and did not recur for several days, and then but feebly."

These points should be remembered:

The quantity of 1:1000 ointment of adrenalin to be used in any affection of a peripheral nerve should not exceed from one to two minims (.06 Cc. to .12 Cc.) by inunction, except in case of the sciatic nerve, when two to three minims may be used. Larger quantities often produce ischemia, which might prove injurious in some cases, notably when application on or near the spine is necessary. Administration by mouth or hypodermically is of little use in neural cases. I have proved this frequently.

The usual time for relief is three minutes. Apparent delay is sometimes caused by mnemonic persistence of the impression, as can be easily proven.

There are many cases of relief from painful conditions uncited because not yet thoroughly tested. But of these I select one—a long-standing case of spastic mucocolitis which had persisted five years with frequent and severe exacerbations. The patient was hemiplegic, and a sufferer from biliary cirrhosis.

An application of 1½ minims of an ointment containing 1:1000 of adrenalin was smeared down the sides of the fourth lumbar and the sacrum. The result was prompt and gratifying, showing the effect on the sciatic and pudic nerves, and the pelvic, mesenteric, hemorrhoidal, hypogastric, and vesical plexuses, through the great gangliated cord of the sympathetic. Within five minutes spasticity and choreic spasms ceased in the paralyzed leg; the tense abdominal muscles relaxed; spastic contractures of the anal and vesical sphincters ended. There was no longer hyperesthesia of those parts, and sleep became possible.

Accompanying these improved conditions was a decided increase in peristalsis and a cessation of the febrile temperature which had prevailed for several months. There was no loss of normal feeling, but only that of reflex pain and contractions, and freedom from these made the elimination of mucus easy, and free from tenesmus. Spasticity of the arm continued, till greatly lessened by the application of two minims of the same ointment girdling the brachial plexus,

and an equal amount half-girdling the wrist on the thumb side.

These effects lasted at first twelve hours, then about twenty hours, then three days. Repeating the application restored the relief in about five minutes. These experiments were witnessed by Dr. Walter Reynolds, after his report had been written.

Application from and including the fourth lumbar, sacrum, and coccyx (two minims down each side) promptly relieved and reduced a severe case of hemorrhoids.

In yet another case painful tenesmus was kept in subjection by the same treatment. A glance at Toldt's fine map of the sacral, lumbar, and coccygeal nerves and plexuses (Toldt's Anatomy, Part VI, on pages 885 and 890) will show the rationale of these results, and indicate the value of similar applications to the fifth lumbar and sacrum in many cases where the abdominal and some where the pelvic viscera are involved.

The fact that the nerves supplying the cervix uteri are derived from the hypogastric plexus, the sacral ganglia, and the sacral nerves, is strongly indicative that hope may be had of similar benefits in labor made excessively painful by reflex nerve flurries.

Since writing the above Dr. Thos. G. Dunlap, of this city, has tried this in a case where he expected difficult labor—a primipara. The adrenalin ointment was applied from the fifth lumbar down, with the result that the patient had a remarkably painless labor. No other means of alleviation was employed.

I will soon have reports from practitioners of record covering this field.

As a final word, I cannot too strongly remind my readers that all these results are obtained by *external* applications in the *manner and quantity given.*

Also that failure may be expected, for reasons given, in all neuralgias due to toxic causes—malarial, intestinal, diabetic, etc., and in the multiple neurites from long-continued alcoholic excess. The reflex neuralgia of eye-strain is often fiercely intractable and soon recurrent, and the pangs of true tabes, Pott's disease, and adiposis dolorosa are hopeless when the roots and ganglia have degenerated beyond repair. Also in gout and rheumatism there are times when no relief follows inunction, but these are temporary and are succeeded by longer periods, when relief is speedy and complete. The former are due to an influx of uric acid or of sodium biurate into the blood current, or flooding some one joint.

Finally, I would say that this therapy cannot be successful in the hands of one whose memory of nerves, their ganglia, roots, distribution, and functions has become blurred through long disuse, and to such I would recommend a careful look at Toldt's Anatomy, Part VI, and the tables of the nerves and of the ganglia in Gould's dictionary, before deciding where the application should be made.

This may sound impertinent, but I have known some excellent practitioners who abandoned cases, afterward treated successfully when I pointed out their errors, frankly admitting that they had not looked at a nerve map for years.

This use of the suprarenal principle is a new and immense field, full of surprises and promise, but also of disappointment to the heedless.

Atlantic City, N. J.

OCULAR MANIFESTATIONS IN VENEREAL DISEASES.[1]

BY AARON BRAV, M.D.,

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Venus is responsible for many of the ills that human flesh is heir to. Her pernicious influence manifests itself not only in him who worships her, but is also transmitted to the third and fourth generations of him that loves her, while showing mercy and kindness untó a thousand generations of him that hates her and disobeys her commandments. The eye cannot escape her venom. The ocular affections probably traceable to her doors are direct and indirect—direct when they appear as complications during the acute stages of the disease, indirect when they are the sequelæ of the disease or when they are transmitted from parents to children as a result of hereditary environments, so common in the venereal diseases. The percentage of ocular affections attributable to venereal sources is rather large, and a great proportion of the blind have sacrificed their eyesight upon the altar of venery.

The venereal diseases affecting the eyes are gonorrhea and syphilis. These diseases are unequally distributed, being more common in the male than in the female sex. They are found in all strata of society; no one is immune to them, and while the acute symptoms are of a well-defined classical nature, the chronic elements are of a more modified and diverse character. These two diseases differ widely in their pathology, symptomatology, course, prognosis, and treatment. The one is an acute infectious disease, the other is a subacute or chronic disease; both however are acquired as a result of sexual intercourse, although the possibility of infection through other channels is not entirely excluded. The one is of short, the other of rather long duration. The one has acute inflammatory signs for the symptomatic expression of the disease, the other has a slow and gradual creeping degenerative action on the various tissues. The one yields readily to active treatment and leaves its victim apparently free from any further serious condition as far as the patient himself is concerned; the other, while yielding ultimately to treatment, requires years for the complete elimination of its toxins if ever they are completely eliminated, and the patient is rarely entirely free from the effect of the disease, for the tissue changes have produced such modification in the normal harmony of the structures and cellular activities as to always predispose to various diseases which are considered syphilitic in origin. Both these diseases may be complicated by ocular conditions in their respective stages. Both diseases are caused by germs, the one by Neisser's gonococcus, the other by Schaudinn's and Hoffman's spirochæta pallida. Both are acquired through the same channels, and both are contagious; the one, however, is a constitutional disease having a local lesion for its first symptomatic expression, while the other is a local disease which by a septic process may, but rarely, become constitutional. The ocular conditions of the one are manifestations of a general constitutional invasion, while of the other they are complications the infectious nature of which has been carried to the eye, not by endogenic channels but through carelessness and from external sources.

The gonorrheal complications are infections of the conjunctiva, which may involve the cornea and the iris. The conjunctival inflammations of gonorrheal origin may be acquired or congenital. The syphilitic complications are acquired or hereditary. The acquired form of ocular infection due to gonorrhea is known as gonorrheal ophthalmia adultorum, while the congenital form is known as ophthalmia neonatorum. Antepartum conjunctivitis or infection *in utero,* while possible, is a rarity indeed.

Gonorrheal ophthalmia of the adult is a

[1]Read before the Northern Medical Society, Dec. 14, 1906.

very serious affection which may lead, if drastic measures are not instituted early, to partial or total blindness. I have seen several cases of total blindness in this affection by the fifth day of the disease. This disease may be acquired during an acute specific urethritis, or, as is often the case, while nursing children with an ophthalmia neonatorum. In both events the infectious material is introduced into the eye from the genito-urinary tract. Gonorrheal ophthalmia of the adult type may also occur in little children, especially in girls. I have an interesting case on record at the Southern Eye Clinic of a child only sixteen months old suffering from this disease. The condition was unilateral, and when I first saw the patient on the fourth day of the disease the cornea was already affected beyond redemption. This child, suffering from measles, was sent to one of the city hospitals, where it contracted a genital gonorrhea, and was then sent home free from morbilli in exchange for a vaginal discharge, which resulted in infection to the eye, with subsequent unilateral total blindness. A very innocent etiologic factor indeed.

The disease manifests itself by acute inflammatory symptoms of the conjunctiva and edema of the lids, pain, and photophobia. The period of incubation is short, while the progress of the disease is very rapid. Of course the chief danger is in the destruction of the vitality of the cornea. The disintegration and sloughing of the cornea is caused by the infectious nature of the discharge. Ulceration of the cornea when already developed before treatment has been instituted as a rule leads to partial or total destruction of the cornea. The rapidity with which this destruction makes its appearance depends upon the resisting power of the cornea and the virulence of the infecting germ. The usual sequelæ of this disease are adherent leucoma, total anterior staphyloma, panophthalmitis, and atrophy of the bulb. Of course these result only in those cases that come too late under observation or in which treatment has been discontinued too early, for very often ulceration of the cornea sets in when convalescence is apparently established. De Schweinitz says that "a fully developed gonorrheal ophthalmia rarely recovers without involving the cornea, and only too often the eye is hopelessly marred." Iritis and cyclitis may also develop as a complication and destroy the usefulness of the eye.

The percentage of blindness resulting from this form of gonorrheal ophthalmia is not determined with any amount of accuracy. In the table of Magnus the percentage of total blindness is given as rather low. In 2328 cases of blindness only 23 cases were caused by gonorrheal ophthalmia in the adult. Of course the disease is preventable, and therefore not very frequent.

The most frequent ocular disease complicating this venereal affection is ophthalmia neonatorum, which is a disease of the new-born child infected by the vaginal secretion of the mother while passing a parturient canal harboring the gonococci, which, though latent in the vagina on account of the unfavorable media and the toughness and resisting power of the vaginal mucous membrane, find a good culture media in the delicate conjunctival tissue of the new-born infant. It is therefore not a hereditary but a congenital condition. This is also a very serious affection and a very frequent one, but not so rapid in its destructiveness as the adult type. The diagnosis, while easy from a clinical standpoint, can only be made with positiveness after a careful microscopic examination which reveals the presence of the gonococci. It is well, however, for the general practitioner to consider every conjunctival affection occurring in a child within the first week of its life to be of gonorrheal origin and institute energetic treatment, and thus give the child the benefit of a doubt rather than be caught unawares. The seriousness of the disease can only be appreciated when we take into consideration that only a few years ago it was responsible for 50 per cent of the cases of total blindness. Fortunately the

number of cases of blindness caused by this disease has been reduced by the prophylactic measures of Credé. Since the introduction of Credé's method the number of cases of ophthalmia neonatorum has diminished to a considerable degree, and at present it occurs mostly in those cases where Credé's method has been neglected and where midwives have acted as accoucheurs. The midwives as a rule attribute an early conjunctival disease to a cold, and the family consequently is not warned of the impending danger, when treatment is delayed; and it is in these cases that the physician is apt to find corneal complications at his first visit. Corneal complications, however mild in this disease, mean a partial or total blind eye as a sequel.

To emphasize the importance of early and energetic prophylactic measures I will cite statistics which give the percentage of blindness due to ophthalmia neonatorum. The committee of the Ophthalmological Society of the United Kingdom has reported that from 39 to 40 per cent of the inmates of four blind asylums in Great Britain owe their blindness to it. Reinhard in 22 German asylums found 658 cases out of a total of 2165—*i.e.*, 30 per cent were blind from this disease. The British Royal Commission estimated that there were about 7000 persons in the United Kingdom who had lost their sight from gonorrheal ophthalmia, or about 22 per cent. Of the 50,568 blind persons in the United States in 1890, according to Burnett at least 30 per cent lost their sight from ophthalmia neonatorum. Of course since the introduction of Credé's method the number of blind have materially diminished, but nevertheless next to optic atrophy this disease is still producing the greatest number of blind.

Iritis is another complication that may occur during an attack of gonorrhea. Gonorrheal iritis is not very frequent. It appears as a constitutional complication in those cases in which a gonorrhea has given rise to a general infection. Iritis of gonorrheal origin as a rule sets in after an outbreak of gonorrheal arthritis. In some cases we find it without joint affection. In its external appearance gonorrheal iritis resembles rheumatic iritis, and like the arthritis has a tendency to recur, and is usually associated with a return of the urethral discharge or a return of the swelling of the joint. No other ocular affections have been attributed to gonorrhea, yet uveal inflammations as a result of constitutional invasion are not entirely improbable. As to heredity, it is well to mention that in some cases it has been found that microphthalmus in the child was the result of gonorrheal ophthalmia in the father. Dutchman has produced the same condition experimentally in animals.

While the gonorrheal ocular complications are limited to the above mentioned conditions, the syphilitic affections of the eye can be stated without fear of contradiction to comprise all possible diseases of the eye with which the present-day ophthalmologist is acquainted. The entire visual apparatus—extrabulbar, intrabulbar, retrobulbar, and intracranial—are all subject to this scourge of modern civilization. Beginning with the lids and to the very visual centers in the occipital region, all the connecting cranial nervous elements may be affected during the life history of a syphilitic. These complications may occur at any stage of the disease, may appear in the so-called parasyphilitic stage, and it is not quite certain that a previous long-continued mercurial treatment will have a positive effect in the prevention of ocular syphilitic sequelæ. This is due to the fact that the syphilitic toxins have so modified the functions of the various organs of the body as to predispose them to all possible degenerations. The transmission of ocular weakness as a result of hereditary influences is characteristic of this disease, so that the second and third generations are not immune.

Chancre of the lid appears of course as a primary condition, and we shall not discuss it in this paper. The lids may be the seat of a primary lesion, secondary infec-

tion, and tertiary manifestation. As a manifestation of secondary infection they appear as papular syphilides or ulcers, while the tertiary manifestations are of a gummatous nature of the skin of the lids which eventually break down and ulcerate, when they are spoken of as tertiary ulcers. Gumma of the lids as a hereditary manifestation is very rare. In children with hereditary syphilis a papular eruption may be found shortly after birth. Syphilitic blepharitis has been described occurring as a result of hereditary syphilis, in which the edges of the lids become ulcerated and the eyelashes fall out. This condition may also occur in the acquired form. The conjunctiva may be the seat of syphilitic eruption, ulcerated syphilides, or a syphilitic conjunctivitis may develop which does not yield to local treatment but is amenable to antisyphilitic measures. The diagnosis in these cases can only be made with any degree of positiveness when other secondary lesions are present. Orbital periostitis is often caused by syphilis and appears as a swelling, giving rise to exophthalmus, pain, and neuralgia, due to compression. Orbital periostitis, while usually a later manifestation, may sometimes occur in the early stages and may even be one of the first symptoms of constitutional infection, occurring sometimes shortly after the initial lesion, and may occur sometimes in children born of syphilitic parents. It is, however, of a more benign nature in the acquired form, where it yields more readily to treatment. Corneal involvement as a result of syphilitic infection is not infrequent and is characteristic. It is of the interstitial variety. It may be unilateral, but is usually bilateral, although one eye is affected first. This disease is common among the negroes and the Irish, but is less frequently found among the Jews, as hereditary syphilis is as yet not very common among the Jews. The disease runs a very long course, requiring months and often years for a cure, although the prognosis is favorable when no complication sets in. The infiltration under proper treatment slowly disappears and the cornea usually regains its transparency. There is always, however, a reduction in the visual acuity. In complicated cases serious conditions may arise resulting in partial or total blindness. As a rule there is no ulceration in this form of keratitis, but a deep vascularization which is characteristic of the disease. The majority of cases of interstitial keratitis are of a hereditary nature. Occasionally it occurs in the acquired form. It occurs usually in the young, from the age of five to fifteen, rarely it manifests itself *in utero,* and the child then comes into this world with either impaired vision or congenital blindness.

Iritis is very frequently of syphilitic origin. Fuchs says that "at least half of all the cases of iritis are referable to it." In these cases it is mostly the acquired form we have to deal with. The diagnosis is not often positive. Of course the presence of syphilitic nodules on the iris and their prompt disappearance under antisyphilitic treatment is sufficient evidence of its etiologic factor. In cases in which the diagnosis is not clear it is well to search for corroborative evidence. Syphilitic iritis occurs in the secondary stage, more rarely in the tertiary, in the form of iritis gummosa, in which cases the growths may attain considerable dimensions and destroy the eye. Syphilitic iritis manifests a great tendency to recur, so that the patient is never free from it. Syphilitic iritis may manifest itself in children as a result of hereditary influence, and in some cases iritis occurs *in utero,* and the child is born with the evidence of it by the symptoms of posterior synechia and occlusion of the pupil, atrophy of the iris, and even atrophy of the eyeball.

Syphiloma of the ciliary body occurs in the acquired form of syphilis. This growth may be the size of a pea or may reach the size of a small nut. The disease commences with a violent inflammation and presents the aspect of a severe case of iridocyclitis lasting from a few days to several weeks, and occurs mostly in the third decade of life. Out of 66 cases re-

ported in the literature, 42, or 63.6 per cent, grew blind; the rest had some vision, only 10 per cent had any considerable vision. The prognosis is of course very grave; 28 per cent of the cases resulted in atrophy of the eyeball; in 30 per cent enucleation had to be resorted to to relieve pain. As to the mode of development, 42 per cent developed in the first two months after the infection, 22 per cent in the second half-year, and in a few cases it occurred later. In 50 per cent it was accompanied by secondary symptoms.

Syphiloma of the ciliary bodies belongs to the early manifestations of constitutional syphilis and occurs before the gummatous period. Of course the rapid destruction of sight is due to complications in the vitreous, choroid, and retina; of which detachment of the retina is the most frequent.

Ophthalmologists are still divided in their opinion on syphilitic retinitis. It is well to note, however, that no less a clinician than Fuchs claims that "acquired syphilis is one of the most frequent causes of retinitis." As a rule syphilitic retinitis is associated with other uveal inflammations, especially of the choroid. Two forms of retinitis are recognized, namely, the diffused and the circumscribed. All authorities, however, agree that the most frequent manifestation of retinal disease is in association with a diseased condition of the choroid, and is usually spoken of as choroidoretinitis or retinochoroiditis. It is important to say that all these diseases greatly reduce the acuity of vision and very often cause blindness. Pigmentary degeneration of the retina, which closely resembles syphilitic retinitis, has as yet not been attributed to syphilis by many; its etiology is practically unknown. I feel, however, very much inclined to attribute it to some degenerative process as a result of hereditary syphilis perhaps of the second or the third generation. Of course I have no direct evidence to corroborate my suspicion, yet it is more plausible than to attribute it to consanguinity, which really explains very little.

The optic nerve is frequently involved in syphilitic infection, either in a process of inflammation or in a process of degeneration. The inflammation appears in the form of optic neuritis, the degenerative condition manifesting itself as a primary optic atrophy. Optic neuritis is often caused by syphilis. The optic nerve may be attacked by the syphilitic virus directly, or indirectly owing to the development in the cranial cavity; or in the orbit inflammations or tumors may develop which are syphilitic in origin and secondarily involve the optic nerve. Optic atrophy, primary or progressive atrophy, which usually leads to total blindness, is in the majority of cases of syphilitic origin, appears in the so-called parasyphilitic stage, and very often is the first symptom of tabes dorsalis. This atrophy is of a non-inflammatory nature, differing in this respect from the atrophy in consequence of neuritis. Optic atrophy is a frequent cause of blindness, and is, according to Magnus, responsible for 20 per cent of the totally blind.

Oculomotor paralysis is a not infrequent condition, and is also a heritage of syphilitic disease. If not all, at least 80 per cent are of syphilitic origin, occurring usually years after the primary lesion. We may have a total or only a partial palsy, depending entirely upon the extent and seat of the lesion.

The other extrinsic muscles may also be paralyzed as a result of syphilitic infection. Ptosis and the Argyll-Robertson pupil are in the majority of cases attributable to lues.

It is impossible to give a clear estimate of the percentage of ocular affection in syphilis. De Wecker gives 15 per cent of ocular involvement, which is most probably underestimated. It is necessary to follow a certain number of cases from the time of infection until death to enable one to give correct data on the exact percentage of ocular involvement, which of course is practically impossible.

Venereal infections are on the increase, so much so that at present the social evil is receiving considerable attention, both from the profession and the laity, who conjointly organize to combat the evil results

by preventive measures in the nature of educational campaigns. Compulsory registration has not proved successful in other countries, and is not likely to be adopted in this country, although it is the only means available to us at present; so that we are still unable to prevent the evil which is responsible for so many ills and about 60 per cent of the blind, which is attributable directly or indirectly to venereal affections.

Some consideration as to the therapeutics of the diseases described will I feel sure be of considerable interest to the general practitioner, who is consulted on many of the conditions mentioned above. Preventive measures are of course the most desirable. In the prevention of gonorrheal ocular complications the method of Credé —that is, the instillation of a drop of a two-per-cent solution of silver nitrate—is very important, and should be employed not only in hospitals but also in private practice, especially where there is a suspicion as to the possibility of gonococci within the vaginal canal. The argument that the silver solution often produces an inflammation of the conjunctiva is not deserving any consideration when its usefulness is carefully measured. Neither protargol nor argyrol nor any other of the silver salts can serve as a substitute for the nitrate; they are positively useless in the prevention of the development of this disease, and should not be used as a prophylactic measure. Gonorrheal ophthalmia of the adult is also a preventable disease. In all cases of acute urethritis the patient should be told of the danger to his eyes and advised to carefully wash his hands, after every contact with his genital organs, with hot water and a bichloride solution 1:1000, so as to be on the safe side. Children suffering from genital discharge should be carefully guarded and their hands cleansed several times daily. In nursing cases of gonorrheal ophthalmia the nurse must be instructed to take particular care of herself. These prophylactic measures will reduce the gonorrheal ocular manifestations to a minimum.

As to the treatment proper in ophthalmia neonatorum, the chief aim is to keep the conjunctival sac as clean and aseptic as possible so as to prevent the involvement of the cornea in the disease process. To accomplish this end a saturated solution of boric acid, or a 1:5000 solution of corrosive sublimate, may be employed. The conjunctiva should be thoroughly flushed and every drop of pus removed. This should be executed with a religious fervor every hour, for the discharge in these cases reaccumulates with marked rapidity. Within an hour after the sac has been cleansed the discharge is again profuse. Ice compresses are indispensable and should be applied constantly for the first five days, while the conjunctiva is swollen and the discharge profuse. These compresses are best made in the form of pledgets of cotton, and should be changed every ten minutes; this lessens the irritation, reduces the swelling, and prevents a rapid multiplication of the germs and the simultaneous reproduction of the discharge. The lids should be brushed twice daily with a two-per-cent solution of silver nitrate by the attending physician, while a 20-per-cent solution of argyrol may be instilled by a member of the family or attending nurse several times during the day at intervals of two hours. Atropine is not necessary in ordinary cases, but should be used in stubborn cases. One drop of a one-per-cent solution should be instilled three times daily. Complications must be met with as they arise. In all ordinary cases this treatment will suffice to save the child from blindness. The same treatment holds good in gonorrheal ophthalmia of the adult type, but must be more rigorous. My best advice to the general practitioner is to refer such cases to the care of the ophthalmologist whenever and wherever an ophthalmologist is available.

As to the treatment of the syphilitic conditions of the eye, let me say briefly that we must use both local and general measures. In some of the chronic conditions constitutional treatment alone is required. In the acute inflammatory conditions, such as iritis, the general treatment consists in the administration of mercury.

The best method to administer this drug is by inunction. One drachm of the mercurial ointment may be rubbed into the skin twice daily, choosing different parts of the body at each application. The local treatment is the same as in all other acute inflammatory conditions of the eye. The use of mercury by the hypodermic needle is in my estimation a useless surgical procedure, having nothing in its favor, and may when long continued give rise to abscesses. In the chronic form the iodides are most useful, and they are best administered in the form of a saturated solution. Where these drugs are indicated they should be given in large and ascending doses, beginning with 15 drops three times daily and ascending to 50 drops if necessary until its physiological effect is manifested. Small doses have little if any value. Should the symptoms of iodism manifest themselves the dose may be reduced or the drug discontinued for a few days. It is well to give the patient a tonic during the administration of this drug, and special care should be taken of his gastrointestinal tract, so that digestion and assimilation be not disturbed. The syphilitic ocular conditions as a rule yield well to treatment. In many conditions, however, the acuity of vision is markedly reduced, and even blindness results despite the most conscientious endeavor on the part of the physician, so that while the social evil exists some people will have to attribute their blindness to syphilis.

TUBERCLE BACILLI PRODUCTS IN THE TREATMENT OF TUBERCULOUS LESIONS.

BY G. R. POGUE, M.D., GREELEY, COLORADO.

Since the discovery of the specific microbic origin of tuberculosis by Koch in 1882, various investigators have endeavored to find some feasible remedy for the disease that counts its victims by hundreds of thousands annually. Koch was the first to bring before the medical world anything that looked at all rational in this line. When he announced to the world his discovery of tuberculin in 1891—not as a cure for consumption, but as useful in lupus and some early stages of tuberculosis—the medical profession hailed the new drug as a cure-all, and men vied with each other to show what remarkable results could be had from its use. Tuberculin was then a crude drug; its composition, physiological and therapeutic properties were unknown, and the dosage was regulated by the fancy of the user. Also the cases thus treated were of the advanced class of pulmonary tuberculosis, and many of them had grave complications or mixed infection.

Kruse in his review of the literature of tuberculin up to 1900 shows the varied ideas held by many of his colleagues, and the fallacy of expecting favorable results in the class of cases reported. He also recites several reported cases showing the dose to have been from 2 to 50 milligrammes, and this amount was often repeated, with no reference to the condition of the patient, with the production of stormy reactions or increasing existing complications. No system already overburdened with toxins and the products of retrograde metabolism could long withstand such additional poisoning. The result of the use of tuberculin in this manner during the earlier years was that the drug soon fell into disrepute, and by the great majority of the medical profession was considered a failure.

Some few workers who had observed favorable results from the use of tuberculin in certain cases of tuberculosis, and who from their knowledge of the pathology of the disease saw greater possibilities in the field of tuberculin therapy, continued to experiment with the drug and other tubercle bacilli preparations. Foremost in this work were such men as Koch, Petruschky, Klebs,

Spengler, V. Behring, Wassermann, and Wright in Europe; Trudeau, Baldwin, and V. Ruck in America. Even to-day while these investigators, whose standing in the medical profession must give weight to their opinions, have shown that tubercle bacilli preparations, properly administered in selected cases, are a very valuable adjunct in the treatment of tuberculosis, only a small percentage of the medical profession is at all familiar with their work, and the majority still hold the same opinions that they formed of tuberculin a dozen years ago.

There has been much theorizing in regard to the physiological action of tuberculin and tubercle bacilli products. "Since the first publication by Koch, on the action of tuberculin on tuberculous tissue, one symptom-complex *has been* especially prominent, viz., *the specific action*. It was certainly something novel that an infectious focus of disease should react specifically to the metabolic products of the exciting microörganism, even when administered in such minute quantities which would not produce any appreciable effect in an organism free from infection. This phenomenon, which was shown for the first time with tuberculin, was later observed in all tubercle bacillus preparations, in so far as these possessed a generally recognized effect on the tuberculous organism. The specificity of this reaction proved to be so valid that its diagnostic application gained more and more ground in human as well as veterinary practice, and to-day tuberculin is widely employed as a *certain* means of diagnosis in doubtful cases of tuberculosis. Not only for diagnosis but also as a therapeutic measure, we attach the highest importance to the specific reaction of the tuberculous focus, and in this respect the local reaction is far more important than the general reaction as expressed by increased temperature" (Wassermann). The chief and most important reaction is therefore the local congestive reaction around the tuberculous tissue.

This local congestive reaction is easily demonstrated in visible tuberculosis, as of the larynx, iris, mucous membrane, and skin, and is observed some few hours after the administration of small doses of tuberculin or other tubercle bacillus preparations. This local hyperemia or flooding of the diseased focus is similar to Bier's method of passive congestion in treating localized infections. The added blood supply also aids greatly in the formation of new tissue around the tubercle, thus more effectually completing the walling-in process. "If the tubercle is successfully isolated by fibrous encapsulation, there arises no consequence of moment to the organism, but if the attempt to wall it off be insufficient, the bacilli multiply rapidly and some migrate radially into the surrounding tissue, spreading infection on every side" (Cornet). It would therefore appear that the local specific action of tubercle bacillus preparations on the tuberculous tissue was to aid the already present forces in thickening the capsule and in that way prevent breaking down of the tubercle during the process of liquefaction and absorption or calcification. This has been shown to be particularly true when the dose is small and not too often repeated at short intervals. By the small properly interspaced doses we get an intermittent hyperemia of the milder form, while with the larger doses frequently repeated the hyperemia is more extensive and continuous. This latter condition tends to soften and break down the new granulating tissue which makes up the capsule, thus liberating the imprisoned bacilli and defeating the object we seek.

As an explanation of the specific local reaction of tubercle bacillus preparations on the tuberculous focus Wassermann and Bruck[5] have shown by a series of unobjectionable experiments conducted at the Institute for Infectious Diseases at Berlin that there is present in the tuberculous tissue or organs an antibody to tubercle bacilli preparations. They also demonstrated that such antibodies *do not* exist in the other tissues or organs of a tuberculous individual who *has not* been treated specifically. They further demonstrated that owing to

the great avidity of these antibodies, situated solely in the tuberculous tissue or focus, for their antigen (the T. B. preparations) they were capable of drawing from the blood such preparations in the greatest possible dilutions (1 in 5,000,000) and neutralizing them within the tuberculous focus. This concentration of T. B. products around the infected focus causes a dilatation of the blood-vessels of the immediate vicinity, together with a gathering of the leucocytes, thus bathing the parts in an excess of the body juices, stimulating cell proliferation and the formation of new connective tissue.

It seemed quite natural to suppose that the amount of "antituberculin" in the tuberculous organs or tissue is limited and would only neutralize a given amount of the "tuberculin." As is stated above, no antituberculin could be demonstrated in the blood or non-tuberculous tissues of a tuberculous animal *not* specifically treated. Neither were antibodies produced in such non-tuberculous tissues of tuberculous animals when the quantity of tuberculin was so graduated that no systemic specific reaction was produced. Such experiments demonstrated that when the amount of the antigen (T. R.) injected was greater than would be neutralized by the antibodies present in the tuberculous tissue, an excess of the antigen remained free and uncombined in the circulating fluids of the body, there to produce (according to Ehrlich's theory) free antibodies in the blood. Such free antibodies would neutralize or combine with the next injection of tuberculin (the antigen) and little or none would reach the tuberculous tissue, thus preventing a local or systemic specific reaction. Unscrupulous dealers in cattle have in this way immunized tuberculous animals by large doses of tuberculin previous to inspection. These immunized animals would then not react to the tuberculin test, and were passed by the inspectors, but later their tuberculosis developed, and it was thought that they contracted the disease in their new surroundings.

Tuberculous persons treated with gradually increasing doses of tuberculin soon become immunized to T. R. and cease to show any specific reaction. Such immunization has no particular effect on the living tubercle bacilli or the progress of the disease, as has been demonstrated by numerous observers.

Smaller doses that cause no systemic reaction and only a mild local reaction, and where the tuberculin injected is all neutralized by the antibodies, situated solely within the tuberculous tissue or focus, have only the local effect of producing hyperemia around the tuberculous focus.

Tubercle bacilli preparations, especially endotoxins, have another specific action. A. E. Wright, of London, demonstrated that when small doses of such T. B. preparations were injected into tuberculous persons there was produced in the serum of such persons a substance that had a certain action on the tubercle bacilli which so modified them that they were more easily and rapidly taken up and destroyed by the leucocytes. Such specific substances he termed opsonins. Wright and his coworkers have formulated a scheme whereby they are able to measure the opsonic power of the blood of persons ill with or convalescing from infectious diseases. This measurement of opsonins is known as Wright's opsonic index. Wright's theory is based on the fact that certain bacteria when treated by the serum of healthy persons are taken up and destroyed by leucocytes at a certain ratio. This ratio is termed the normal opsonic index.[1] From this standard the serum of infected persons is measured, and may be above or below normal. With reference to tuberculosis it is known as the tuberculo-opsonic index. In examining the serum of persons suffering from tuberculosis, it was found to be in the great majority of cases far below normal.

From numerous experiments Wright found that the opsonic power of the blood of these tuberculous persons could be raised by the administration of small doses of tubercle bacilli toxins (0.001 to 0.005 mg.). For one or two days the opsonic index was

lowered (negative phase), after which it began to rise (positive phase) even to double or treble the normal (2.). This fall and rise is spoken of as the ebb and flow of Wright. It is after the index has reached its height and begins to decline that the toxin is again administered, thus restimulating the production of an increase in opsonins. The average time between doses is seven to twelve days, and the inoculations are governed by the opsonic index and therefore properly interspaced. Wright also demonstrated that larger doses of T. B. toxins so depressed the opsonic index that during the ebb the index would not return to normal, here again showing the detrimental effects of large doses of T. B. products on the tuberculous individual.

That the opsonic power of the serum is not bactericidal is shown by the fact that tubercle bacilli treated with a serum of high opsonic power will live and multiply in such serum, but on the addition of washed leucocytes the bacilli are rapidly taken up and destroyed by the leucocytes. That the opsonins have a direct action on the bacilli and not the leucocytes is shown by the following experiments: Washed leucocytes treated by + opsonic serum and then washed do not take up more bacilli than when treated in the same manner by normal serum. Bacilli treated with + opsonic serum and then washed are more rapidly taken up by the leucocytes than when treated by normal. This shows that the opsonins have a direct specific action on the bacilli.

The therapeutic value of Wright's vaccine is now easily understood. In localized ulcerating or open tuberculosis a greater or less number of tubercle bacilli are free in the tissues and are ready to be carried to new territory by the blood or lymph stream, there to set up new foci of disease. With a low opsonic power of the serum few of these bacilli are destroyed by the leucocytes. By increasing the opsonins to a high standard the bacilli are so changed or weakened that they are attacked and destroyed by the leucocytes. Wright[2] reports several cases treated by these small doses of T. B. toxin, which had existed for some time and had previously resisted all other lines of treatment, including in some cases increasing doses of tuberculin. The results were certainly good, much better than had been previously reported in similar cases from any line of treatment. Such investigators as Douglass, Bullock,[3] Harris, and others have reported similar results from the same line of treatment in similar cases.

What further investigations in this line may bring forth no one can predict. There has been much claimed for antituberculous serum, but from our knowledge of the pathology of tuberculosis we cannot expect much from such a serum even though we did possess one of the greatest potency. In the early or milder cases (closed tuberculosis) the bacilli are walled in by a nonvascular fibrous capsule, and are safe from the influence of any substance introduced into the system or circulation. Such a tuberculolytic serum would, however, prove very useful following the rupture of a focus into the tissues or blood stream, or in the case of aspiration pneumonia following the rupture of a focus into a bronchus —that is, if we could recognize such accidents before the escaped bacilli had become localized and protected by partial or complete encapsulation. In a given case of tuberculosis the myriads of tubercles are of all grades and ages, and there is no way of foretelling when one or more may rupture.

From our present knowledge of the specific treatment of tuberculosis the procedure becomes narrowed down to two propositions, viz., first in aiding in the thickening of the capsule around the already imprisoned bacilli, by means of localized congestion, intermittent and of short duration (local specific reaction); secondly, by increasing the opsonic power of the blood, thus preparing any free bacilli for destruction by the leucocytes. If the free bacilli can be kept under control and prevented from forming new foci of disease the permanent arrest of the encapsulated bacilli would not appear so difficult.

My experience with *tubercle bacilli preparations* in the treatment of tuberculosis during the last six years is based on the review of 253 cases; 176 have already been reported.[4] The most noticeable feature about the arrested cases is the very few relapses that have occurred up to the present time, and those that did relapse generally disobeyed all instructions given them. There has also been an apparent permanent arrest of the disease in the early cases, a discussion of which I do not purpose to enter upon at the present time.

In treating these cases specifically I used antiphthisin (Klebs), which is claimed by the manufacturer to be a purified tuberculin free from the tubercle bacillus endotoxins. This preparation has been used when it was desirous of producing only the local reaction, in doses of .01 to .5 milligramme. Recently I have used the pure toxin or endotoxin, obtained from the tubercle bacillus, free from culture medium or metabolic products, in the treatment of open tuberculosis for the purpose of increasing the opsonic power of the blood. It is too early to pass an opinion on the results, but up to the present they have been very satisfactory.

1. Hektoen: *Journal A. M. A.*, May 12, 1906.
2. London *Lancet*, Dec. 2 and 19, 1905.
3. *Practitioner*, November, 1905.
4. *Medical Record*, Aug. 4, 1906.
5. Wassermann and Bruck: *Deutsche med. Woch.*, vol. 32, No. 22.

EXAMINATION OF THE FECES.[1]

BY GEORGE H. JONES, M.D., TOLEDO, OHIO.

Examination of the intestinal dejecta is unfortunately often neglected, and compared to the thoroughness and routine with which other materials are investigated it must be acknowledged that the feces receive but slight consideration. The chief causes of this indifference are quite clear to those who have given the matter much thought. In the first place there is the disagreeable nature of the material and its unpleasant odor; to this must be added the difficulty in transportation, and the lack of exact clinical data resulting from a single examination. These objections, it must be admitted, are somewhat justifiable, but the same could with equal right be made against other secretions and excretions, which are habitually examined, without a thought of the unpleasantness of the task. Aside from those who give intestinal diseases their special study few physicians make systematic and repeated examinations of the feces of their patients. Nevertheless this work is extremely important in the diagnosis and pathology of diseases of the intestines, and often furnishes the only means for the formation of an opinion as to the nature of the condition. By this it should not be understood that the large majority of practitioners fail to consider the evidences of disease to be found in the feces. On the contrary, careful inquiry is usually made of the patient or nurse as to the consistence of the stools, and the presence of blood, mucus, pus, etc. Too often the reply is accepted without question and becomes a part of the diagnostic scheme. It is here that the mistake is made, and it must be emphatically said that these examinations are not satisfactorily made by individuals who have had no training in this work. Examinations of the feces in gastrointestinal disease is as important as that of the urine in diseases of the kidney, and it cannot be too strongly urged that careful examination of the dejecta should be made with the naked eye and the microscope as a routine procedure in the investigation of all cases of gastrointestinal disorder. Chemical examination, too, will often give considerable information, but as a rule it furnishes less than the two methods just men-

[1]Read before the Toledo Microscopical Society at its regular meeting, January 9, 1907.

tioned, and aside from the tests for blood gives little clinical data.

MACROSCOPICAL EXAMINATIONS.

The macroscopical examination of the feces consists of an investigation of: (1) Form and consistence. (2) Color. (3) Odor and quantity. (4) Abnormal ingredients, such as mucus, pus, blood, parasites, and concretions.

This examination alone is often sufficient to enable an experienced observer to form a judgment of the case. The technique is simple, and ordinarily no special preparation is necessary, except in a search for gall-stones, the head of a tapeworm, or intestinal parasites, when the feces should be washed through a fine sieve. For this purpose the stool sieve described by the writer will be found serviceable and inexpensive, and greatly simplifies the examination for these materials.

1. *Form and Consistence.*—Normally the stool is cylindrical and of a somewhat uniform caliber. In adults it is always formed, while in infants it is quite soft and pasty. Delayed peristalsis resulting in a prolonged stay in the colon causes a large part of the water to be absorbed, resulting in an extremely hard fecal mass; this may become broken into small round masses called scybala. If, on the other hand, peristaltic action is unusually rapid, the feces are hurried through the intestinal canal without sufficient time for the absorption of water, producing dejecta of a soft or semifluid consistence. When not due to cathartics or diet, such stools are pathological, and it is often extremely difficult to determine whether the increase of fluid is due to exudation or transudation from the mucous membrane, or to deficient absorption. It is here that microscopic examination offers additional data.

2. *Color of the Stools.*—(*a*) Dark brown is the usual color in health, due mainly to the presence of hydrobilirubin, but foods have an influence on the color and considerable variations may occur. Thus, certain foods of decided color, such as blackberries, whortleberries, red wines, etc., impart their color to the stools, while meat diet causes dark and vegetable diet yellowish discharges. Various drugs also influence the color, and among these may be mentioned bismuth, iron, manganese, rhubarb, senna, santonin, kino, and hematoxylon. (*b*) Clay-colored stools are usually indicative of a deficient amount of coloring matter in the intestines, which may be due either to some obstruction of the common bile-duct, or to a diminished formation of bile. It should not be forgotten, however, that such stools often occur when there is no evidence of these conditions, and in such cases the clay-colored stool is due either to the presence of an excessive amount of fat, or to bilirubin having been reduced beyond the stage of hydrobilirubin to a colorless body, leucohydrobilirubin. (*c*) Green stools may be caused by the presence of a color-forming bacterium in the intestine or to the food; the most frequent cause is the presence of biliverdin. In adults green stools are but occasionally seen, and accompany some increase in the peristaltic action of the intestines. This may be due to diarrhea, but is most frequently observed after the administration of a cathartic, such as calomel; this causes the bile to be swept out before it undergoes the usual changes. (*d*) Tarry or black stools, when not due to drugs or diet, usually occur after a leakage of blood into the intestinal canal.

3. *Odor and Quantity.*—The odor of the adult stool is due mainly to the products of proteid decomposition, and is therefore greater in the case of a meat diet or when the fecal matter has remained for some time in the intestines. On the other hand, feces hurried through the canal have little time for decomposition, and hence have little odor. The quantity of the feces varies with the quantity and nature of the food. Vegetables increase the amount because of the large percentage of indigestible material contained in them. The amount of the evacuation does not, however, depend entirely upon the food taken, for it has been estimated that intestinal débris may amount to one-sixth of the total quantity of feces. Intestinal bacteria, too, furnish

in health one-third of the feces, and in diseases favoring the growth of bacteria this may be doubled. An increase in the daily amount of the feces is also observed when there is deficient digestive juices, diminished absorption, or increased peristaltic action.

4. *Abnormal Ingredients.*—(*a*) Mucus. In the normal stools of adults no trace of mucus can be found macroscopically, and with the exception of that seen in mucous colitis, and on hard fecal masses which have remained some time in the colon, mucus in the feces is an evidence of intestinal catarrh. The converse is not true, however, for the absence of mucus in no way excludes the existence of a catarrhal condition. When voided pure, thick, and glistening, or as a thick coating on the feces, it points to disease of the rectum or large intestine. If in smaller quantity and thoroughly diffused through the fecal matter, it indicates that the small intestine is involved; the finer the division of the mucus and the more pronounced its discoloration from bilirubin, the higher is the seat of the disease. (*b*) Pus may appear with the dejections, and when present in large amounts is easily recognized by the naked eye. When passed pure it comes from the lower bowel and is an indication of the rupture of an abscess. (*c*) Blood when found in the stool is always of pathological significance. As a rule bright-red blood comes from the lower part of the bowel, while that which is of a tarry or coffee-ground appearance is more apt to have its origin from the upper part of the digestive tract. (*d*) Parasites. The *Ascaris lumbricoides,* or roundworm, is the most common human parasite, and is often found in the stools of children. It is cylindrical, from three to twelve inches in length, of brownish-red or yellow color, and has considerable motility. The *Oxyuris vermicularis,* or threadworm, is also frequently found in the stools of children. It is of a white, threadlike appearance, and varies from one-sixth to two-fifths of an inch in length. Two varieties of tapeworm are found in this country, parts of which may be passed with the feces. One, the *Tænia saginata,* or beef tapeworm, is the most common. This consists of the head, which has suckers but no hooklets, the neck, and many segments, which gradually increase in size from the head downward. The total length of the worm varies from twelve to twenty feet. The other variety is the *Tænia solium,* or pork tapeworm, which is provided with hooklets as well as suckers on the head; its individual segments are shorter and narrower than the beef worm, and the total length is less (10 to 12 feet). With these exceptions it is similar in appearance to the *Tænia saginata.* (*e*) Concretions are of several varieties, and are either biliary, pancreatic, or fecal. Of these the most important are the gall-stones. There are friable, reddish-brown, or whitish masses, varying in size from a millet seed to a pigeon's egg, and either smooth or faceted, depending on the number in the gall-bladder when the stone was formed. On section a dark nucleus is usually seen surrounded by cholesterin. Gall-stones composed of cholesterin float on water, while those made up of inspissated bile or calcareous salts are heavier and will sink.

MICROSCOPICAL EXAMINATION.

Microscopical examination of the feces requires a semifluid material, which may be obtained by mixing a small amount of water or normal salt solution with the stools. If offensive a two- to four-per-cent solution of formaldehyde or a solution of thymol may be added, after which a drop or two is placed on a slide and covered with a cover-glass. The examination for special elements is facilitated by allowing the fluid material to settle, when it will be found that the heavier muscle and vegetable fibers are at the bottom, parasite eggs in the middle, and bacteria, fatty acid crystals, and light cellulose materials are in the upper layers. The examination consists of a search for: (1) Food particles. (2) Parasites, ova, and microörganisms. (3) Blood cells, pus, epithelia, and mucus. (4)

Crystalline elements. (5) Fragments of intestinal mucosa or neoplasms.

1. *Food Particles.*—(*a*) Muscle fibers occur in all normal stools. They appear as yellowish cylindrical masses rarely showing any striation, and their presence even in large numbers is of little diagnostic value unless the increase is constant. Nothnagel's carefully constructed law is as follows: "If we find an abnormally large amount of muscle fibers in the feces with definite symptoms of intestinal catarrh (as shown by the presence of mucus), and an absence of fever, it is justifiable to conclude that catarrh of the small intestine is present." (*b*) Elastic and connective tissue are also found in the stools, but have no diagnostic significance. (*c*) Free starch granules are practically never found in normal stools, and their presence even in moderate amount is always pathological. On the other hand, starch masses enclosed in cellulose membranes are frequently seen. Unaltered starch granules are found in diarrheal conditions, in cases of hyperacidity of the stomach, and when there is a lowered activity of the pancreatic ferments. Starch is best recognized by the characteristic blue color which it assumes when treated with a weak iodine solution. (*d*) Fat appears in the feces in the form of globules and crystals. Fat globules are recognized as round refractile bodies which are stained black by osmic acid or red by Soudan III. Fat crystals are either fatty acids or fatty soaps. Fatty acids are short, slender needles, soluble in ether, which melt into globules when heat is applied to the slide. Fatty soaps also occur as needles, but are coarser than the former, are insoluble in ether, and do not melt when heat is applied. Both fatty acids and soaps take the fat stains, but the color is not so deep as in the fat globules. Fat regularly appears in normal stools, and depends upon the quantity ingested. Abnormal amounts are observed in biliary obstruction, pancreatic disease, or any condition associated with increased peristalsis. (*e*) Masses of coagulated albumin or casein are frequently found in the feces of those who have partaken of large quantities of milk or eggs. Pieces of casein stained with bile and containing globules or fatty acids are often seen in the stools of infants suffering from intestinal indigestion.

2. *Parasites, Ova, and Microörganisms.*—Parasites: Amœba Dysenteriæ. The examination for ameba should be made from a perfectly fresh stool, for the parasite easily loses its ameboid motion, which is its most characteristic point. A blood-streaked particle of mucus should be selected, placed on a warm slide, and covered. Under a low power of the microscope the organism will be found to be made up of a nucleus surrounded by a coarsely granular mass of protoplasm, which contains vacuoles and often red blood-corpuscles. The size of the ameba varies considerably, and has little if any relation to its pathogenicity. At rest it is round or oval in shape, but when in motion the parasite extends one or more arm-like prolongations called "pseudopods," and its protoplasm follows. Unless this ameboid motion can be detected a differentiation between the parasite and degenerated cells is difficult. The causal connection between amebas and intestinal infections has never been fully settled, but it is most probable that the ameba is a secondary and not the primary agent in the infection.

Ova: (*a*) The eggs of the *Ascaris lumbricoides* are oval, protected by a transparent shell, and outside of this is an albuminous envelope. When passed in the feces the egg shows no embryo, but only a mass of yellowish granular protoplasm. (*b*) Eggs of the *Oxyuris vermicularis* are oval and have a chitinous shell. In the feces they appear either as masses of fine granular protoplasm with a small nucleus, or in the various degrees of embryological development. (*c*) The eggs of the *Tænia solium* and *Tænia saginata* are indistinguishable. They are oval, with a thin shell. The embryo has a rudimentary scolex with six hooklets. Its shell is thick and radially striated. (*d*) Enormous

quantities of eggs are found in the stools of those suffering from uncinaria americana. The eggs of the hookworm are elliptical, with a transparent shell, and frequently present various stages of segmentation.

Microörganisms: One of the most important pathogenic microörganisms found in the feces upon microscopic examination is the tubercle bacillus. The technique of its demonstration is the same as that for sputum examinations. The method is, however, of limited value, and the diagnosis of intestinal tuberculosis should never be made unless there is an entire absence of sputum and the tubercle bacilli are constantly found in thin, watery stools.

3. *Blood Cells, Pus, Epithelia, and Mucus.*—Red blood cells are quickly destroyed by the intestinal secretions, and when found are usually from the large intestine or rectum. If disease of the rectum can be excluded, the presence of red blood cells in the feces may indicate dysentery, ulcer, intestinal tumor, or obstruction. White blood cells appear normally in the stools in small numbers, and in acute or chronic catarrhal conditions of the bowel they are considerably increased. Eosinophiles are found in the stools of persons suffering from intestinal worms, or mucomembranous colitis. Epithelia are constantly found in the feces, but usually are so affected by digestion that special care is necessary to identify them. Cylindrical epithelia are the most important, and are frequently so altered that all stages from normal to degeneration may be seen. Epithelial cells are very prominent in all inflammatory diseases of the intestine and best studied in fresh mucus. Large numbers of cylindrical epithelia embedded in mucus are usually found in catarrhs, while on the other hand mucus without epithelia indicates that the condition is a neurotic and not an inflammatory one. Mucus appears as transparent, slightly striated masses. Often epithelia, leucocytes, blood cells, or food remnants are found embedded in the mucus, and in such cases its origin has probably been high up in the intestine.

4. *Crystalline Elements.*—A variety of organic and inorganic crystals occur in the feces. They have no diagnostic significance. Triple phosphates and calcium oxalate crystals are the same as those seen in the urine. Calcium phosphate occurs as small wedge-shaped crystals radiating from a common center. Cholesterin crystals are not common, but are sometimes found in the stools of infants. They are recognized by their rhombic form, and when treated with sulphuric acid become a deep red. Charcot-Leyden crystals are identical with those seen in the sputum, and are frequently found in the dejecta of persons harboring intestinal worms. They are colorless, octahedral bodies with sharp margins, and somewhat resemble fatty acid crystals, but are distinguished from these by their solubility in hydrochloric acid and insolubility in alcohol or ether.

5. *Fragments of Intestinal Tissue or Neoplasms.*—Necrotic tissue from inflammatory conditions involving the intestinal wall sometimes appears in the feces. Polypi, the sloughs from invaginated bowel or from tumors, are also occasionally found. Although the preceding description of the examination of the feces is less exhaustive than the subject deserves, enough has been given to clearly show the diagnostic value of such examinations. No close student of the manifestations of disease can afford to neglect this valuable means of investigating the secretive, absorptive, and motor functions of the stomach and intestines. Schmidt and Strassburger, Nothnagel, Boas, and other pioneer workers in this field have pointed out the vast clinical data which may be obtained from such examinations, but much work remains to be done. Little by little this will be accomplished by contributions from the great army of practitioners who have learned the value of regular and systematic examination of the feces.

THE TREATMENT OF INTERNAL HEMORRHAGES.

BY G. WERLEY, M.D., EL PASO, TEXAS.

I have no specific for hemorrhage. The treatment of internal hemorrhage is very unsatisfactory.

In the management of hemorrhage we have but one object, and that is to secure the formation of a clot in the bleeding vessel. Let us then review a few facts. It is well established that the soluble salts of calcium are essential to the formation of the blood clot. When these salts are precipitated out of the blood by potassium oxalate, coagulation will not take place; but if calcium chloride is again added, clotting will promptly follow. When these salts are deficient, as in habitual nose-bleed, I have many times seen the chloride of calcium give prompt relief.

The clotting of blood in the vessels is favored by slowing the blood current. The blood current at the bleeding point may be reduced by lowering the general blood-pressure. In some cases, as in bleeding from the intestines or brain, the blood may be diverted to other parts of the body, thus reducing the pressure and slowing the current in the bleeding vessel. Mechanical rest of the bleeding point is also necessary to prevent detachment of the clot.

The treatment of cerebral hemorrhage is well established and is in accordance with the principles just stated. So far as I know, no one would think of giving adrenalin or styptics in apoplexy. Why then give them in pulmonary hemorrhage?

True, in bleeding from the lungs the conditions are somewhat different. In the first place the blood stream cannot be diverted to other channels, for all the blood must pass through the lungs in its circuit of the body. On the other hand, the normal pressure in the lungs is only one-seventh or one-eighth of that in the systemic circulation. Another fact of great importance is that the blood-vessels of the lungs are very poorly or not at all supplied with vasomotor nerves. Arterial pressure in the lungs is not regulated independently, but varies with that in the systemic circulation. Plainly, then, the giving of adrenalin, ergot, or other vasomotor stimulants is most irrational in pulmonary hemorrhage; for such treatment can have but one effect, and that is to raise the pressure and increase the rate of flow in the bleeding vessels of the lung.

There is one condition, however, in which cardiac and vasomotor stimulants may do good. When the left heart is crippled from valvular defects or otherwise, resulting in back pressure in the lungs, heart stimulants will lower the vascular tension in the lesser circulation and thus aid in stopping pulmonary hemorrhage. Bleeding from the arm is also a rational procedure under these conditions.

When the heart is normal, treatment should be directed to lowering the blood-pressure and slowing the current. Rest in bed will quiet the heart and reduce the pulse-rate. Among drugs, morphine (without atropine) will do the most good, by quieting the patient and lowering vascular tension; for fright and anxiety are most potent causes of high blood-pressure (Francis Hare). Aconite, chloral hydrate, and nitroglycerin or amyl nitrite are indicated for similar reasons. Francis Hare has found amyl nitrite to stop pulmonary hemorrhage almost instantly in nearly every case. One should not forget, in case the hemorrhage persists, to give either the chloride or lactate of calcium to increase the coagulating power of the blood, which may be deficient. Two or three drachms should be given in the course of a few hours, and then its use should be discontinued. These drugs produce prompt results when the proper indication exists. Styptics and astringents, such as gallic acid, tannic acid, sulphuric acid, and the like, cannot possibly reach the bleeding point in sufficient concentration to be of any service.

Now as to intestinal hemorrhage. Here the conditions are again different. The blood-vessels of the intestines contract very actively under stimulation of the splanchnic nerves. The portal veins are also supplied with vasomotor nerves (Howell). In fact, according to Howell, the splanchnic nerve "plays a predominating part in the maintenance of normal blood-pressure." This is important, for by actively stimulating the vessels of this area the blood current may be diverted to other channels. According to the experimental results of W. E. Dixon, of London, ergot, digitalis, strophanthus, barium, and lead each cause contraction of the arterioles, especially in the splanchnic area. According to Pal, the salts of lead have a special, selective action for the blood-vessels of the intestines, like that of ergot for the uterus. He considers lead colic to be due to the irritation and contraction of the vessels in the intestinal walls.

The recent experiments of Dr. Fenton B. Turck demonstrate that water at 120° F. in the colon causes marked contraction of the blood-vessels controlled by the splanchnic nerves, at the same time dilating the peripheral circulation. He has also shown that placing the feet in hot water has the same effect. If Dr. Turck's conclusions are correct, hot-water enemas and hot foot baths almost ideally meet the conditions to stop intestinal hemorrhage. In view of the foregoing facts we may sum up the treatment of intestinal hemorrhage as follows: (1) Absolute rest. (2) Withdrawal of food and the giving of opium to quiet intestinal peristalsis. (3) Lead acetate, five grains every hour, to contract the intestinal blood-vessels. There is no objection to giving ergot, and Pepper thought it the best remedy. (4) Hot foot baths and hot saline enemas for the reasons above indicated. (5) The soluble salts of calcium may be given to hasten the clotting of the blood. (6) Local astringents, such as tannic acid and subsulphate of iron, may be given with a very slight hope of their reaching the bleeding point; but the results of their direct application in nosebleed is often so disappointing that one cannot give these drugs in intestinal hemorrhage with much confidence.

TREATMENT OF LOCAL INFECTIONS.[1]

BY HENRY S. WIEDER, M.D.,

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The subject of this communication has probably appealed to many as extremely commonplace, since it is one with which every practitioner has considerable experience in the course of a year. A rather large dispensary practice in addition to private work for the last few years, during which time there has been ample opportunity to study the various methods of treatment used by different men, has convinced me that a few profitable moments can be spent in discussing this subject in an effort to arrive at some conclusion as to what method is best adapted to the majority of cases. In the following remarks I make no claim of originality, but I have simply tried to sum up the results of a rather large and successful experience with the subjects treated.

The first subject to be considered is what may be called the "poultice" cases—that is, those cases in which the laity always and some of the profession often apply the flaxseed or the milk poultice. This class is placed first because it represents the initial stage of all infections and because there is the greatest diversity of opinion as to how it should be handled.

For the purpose of discussion, let us consider the typical case that is seen so often, viz., the neglected scratch on the finger or hand or the furuncle on the wrist, before the stage of suppuration. When the patient is first seen he has a

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swollen, edematous member, hot and tender, with marked induration all around what may be the remains of an abrasion or slight wound or infected hair follicle. The patient complains of throbbing pain with loss of sleep, and shows considerable anxiety for fear of "blood poison." Palpation always causes pain, which is especially located at the point of infection.

From the throbbing character of the pain and the general appearance of the lesion we know that we have an infection which will not go on to resolution without appropriate treatment, but which will spread to the neighboring glands and structures, and if unchecked may become general. What is the appropriate treatment? Shall we poultice it and wait until it shows the green head of "pointing," or more probably has spread into the glands of the axilla? Shall we apply ichthyol or antiphlogistine and wait? Shall we dress it in lead-water and laudanum and wait?

Personally I rarely if ever resort to any of the above plans. I cannot understand where there can be any advantage in placing moist warmth, in the form of a dirty poultice, over an infected area to cause an increased destruction of tissue by giving the bacteria present a favorable temperature for growth in an already favorable medium. It may be true that, in a moderate degree, local leucocytosis is promoted, but I do not believe that this result is attained so much by the heat as by the increased amount of toxin that is formed as the results of the increased growth of the bacteria. Again, the process is a very painful and very slow one. Still worse is the fact that this moist heat promotes the growth of the bacteria that may be present in the hair follicles in the neighborhood, so that it tends to promote the formation of other furuncles or points of infection in the same region. Finally, should the infection point and discharge, the poultice is not absorbable or antiseptic, so that the pus is spread over all the surrounding skin, infecting all the follicles in the same region. This infection may lie dormant for some time, but every one knows how common it is to have the formation of other furuncles or infections in the same region, especially in poulticed cases. Examples of this are very frequent on the back of the neck and the wrist.

Ichthyol and antiphlogistine are preferable to poulticing, but they also are lacking in the essential feature in that they make no effort to destroy the nidus of infection, neither being germicidal in their actions nor reaching the nidus were they so. In some few cases of infection of a minor degree of slow development and little pain I have, through timidity or lack of sufficient intelligence on the part of the patient, been tempted to use the above remedies, but never with much success.

The method that has given the best results is as follows: In cases, as the one stated above, in which no fluctuation can be detected, but in which there is the remains of a wound or a point of especial tenderness, after the usual cleansing, a rather small incision is made over the point of greatest tenderness deep enough to allow free bleeding and to reach, if possible, the focus of infection. It matters little if pus is found or not. After allowing the wound to bleed freely for a time to flush out the infected blood that may be in the tissues, the entire wound is freely carbolized with pure carbolic acid, then packed and covered with a wet bichloride dressing. C. B. Longenecker in the *Pennsylvania Medical Journal* for May, 1905, recommended sterilization with camphophenol (camphor 2 parts, phenol 1 part), and packing with gauze saturated with the same solution, but I have had no experience with this remedy in local infections. In addition to dressing the wound as described above, the patient is given a prescription for bichloride tablets which he is told to use, one to a quart of as hot water as can possibly be borne, soaking his bandage and all, without removing the dressing, in this hot solution three times daily for one-half hour on each occasion.

There are three reasons for opening these cases so early. By so doing the nidus of infection is often reached and, with the free use of carbolic acid, steril-

ized. The minor inflammation that ensues is the result of the carbolic acid burn, not of infection, and consequently rapidly subsides. It also breaks the non-absorptive area of the skin and opens a small avenue for absorption of the bichloride solution by the softer tissues, thereby succeeding in accomplishing the result desired even when the carbolic acid has failed. Finally, should all of the above means fail to abort the infection and should it go on to suppuration, the incision will greatly reduce the pain suffered during the formation and accumulation of pus by relieving the tension of the unyielding skin and making a point of least resistance for the pointing of the abscess. It gives the infection an opportunity to point before there is much destruction of tissue and injury to the deeper structures.

Having made the incision and carbolized the wound, the patient is instructed to return the following day, on which occasion one of two conditions are found: The inflammation has greatly subsided, also the pain and induration, and on the piece of drainage, if it has remained in, there is a small amount of secretion, but no distinct pus; or the inflammation has continued to spread and there is pus in the wound. Probing reveals a cavity or shows a dense, necrotic, yellowish mass or "core" in the center surrounded on all sides with fluid pus, the cavity having its orifice at the site of the wound made on the previous day.

In the former instance, where there is no formation of pus, the simple application of a wet bichloride dressing for another twenty-four hours will suffice to accomplish a cure. In the latter instance where it has gone on to suppuration, the cavity should be freely laid open, preferably with a scissors, as it is more quickly accomplished than by a knife and does not frighten the patient, because he does not suspect what is going to happen until it is all over. The central slough or nidus is removed with forceps if possible, but simple infected cases or furuncles are never curetted when first opened for fear of opening new avenues for the spread of the infection before the formation of a barrier in the form of a well-developed pyogenic membrane. I do not often cleanse with hydrogen peroxide for fear of distending the tissues and accomplishing the same undesired result. After washing it out with bichloride solution, sometimes the cavity is carbolized and packed, or often is just packed and dressed with a wet bichloride dressing. For packing the wet bichloride gauze selvage has proven the best for drainage and the easiest to handle. Dry iodoform gauze or any other form of dry packing should not be used, for while its capillarity is undoubtedly greater for a time, it allows the pus to "cake" on the surface at the mouth of the abscess cavity, and within several hours another abscess is formed with the gauze packing acting as a cork to hold in the pus. It is because of this fact, which also holds true for the selvage packing unless kept moist, that the patients are given prescriptions for bichloride tablets with instructions for soaking their dressings. If the patients are too young or not sufficiently intelligent to trust them with the bichloride, they are instructed to soak the bandage with hot boiled water instead. It is surprising what relief the patients experience as the result of these baths. It is almost a daily occurrence to have a patient state that he had had pain again in a few hours after treatment until he had soaked his bandage, and then there was instant relief.

The reason for the relief given is easily found, the modus operandi being about as follows: The hot solution loosens up the caked pus at the orifice of the abscess and moistens the wick of gauze so that it again begins to drain and empty the cavity of its pus. In addition to reëstablishing drainage, it acts as if the cavity were being thoroughly syringed with bichloride solution thrice daily and sterilizes whatever bacteria may still be within reach of the solution, so that only sufficient inflammation remains to accomplish the healing of the defect, and is not increased by the remaining bacterial infection. The bichloride soakings also sterilize the pus

that is drained out of the cavity so that it does not become rubbed into the healthy skin surrounding the wound and later develop into other infections. This one fact alone would be sufficient to cause it to displace the old poultice.

At the next dressing, on numerous occasions, a dry cavity has been found on removing the packing, and in any event the amount of pus secreted is less than by any other method that I have seen used in the past. The cavities heal rapidly and painlessly and require less care and changing of dressings than if the dry method is used. I do not believe in wet dressings with waxed paper over them, for while the paper keeps the dressing moist longer than without it, the dressing will eventually dry out, and in the meanwhile the heat of the part has converted it into a moist warm dressing or poultice. This, while preferable to other forms of poultices, is open to the objection to which all poultices are subject.

With reference to the cases where the patients had not been seen during the early stages described above, but only after the infection has pointed, there is little to say in addition to the above. Make sufficiently large incisions and drain as described above.

While I know that it is almost superfluous to call the attention of this gathering to the difference in the gravity of infections of the thumb and little finger as compared with infections of the other fingers, for the sake of completeness I will make brief mention of the fact. The synovial sheaths of the three middle fingers terminate as blind pouches at the metacarpophalangeal joint, whereas the synovial sheaths of the little finger and thumb are continuous, the one with the sheath of the common flexors and the other with the sheath of the flexor longis pollicis. Both of the latter extend above the annular ligament, so that infections of the little finger and thumb that gain entrance to the tendon sheaths, as the tenosynovitic form of panaritium, spread rapidly under the annular ligament and up the arm.

Lymphangitis and phlebitis are not very common complications of cases treated vigorously. Personally I have seen only two of the former and none of the latter during the last three years in a very large number of infections treated. In the event of its occurrence the bichloride drainage of the wound with the application of a large wet bichloride dressing the full length of the infection, accompanied with the soakings prescribed for the original wound, should suffice to cure the infection without further spread. Of course, should additional abscesses form along the course of the vessels, they will have to be treated in the same manner as the original infection.

The mistake must not be made that lymphangitis or phlebitis is necessary to have infection of the neighboring glands, for the infection can travel along lymph and venous channels and be filtered out at the glands without affecting the vessels in the least. This mode of infection to the nearest glands is rather frequent in a minor degree, especially in cases that have been poulticed or which have been opened and are not draining well. It can be easily overcome by free incision or reestablishment of free and continuous drainage at the site of the original infection. Only once have I had to open the axillary glands as the result of an infection lower down, and that case was in condition for opening when first seen.

With reference to panaritium, I will merely mention the various forms and briefly call special attention to two of them. Panaritium is divided into cutaneous, subungual and paraungual, tenosynovitic, osseous, and arthritic. In all the treatment is very free incision and draining at the very earliest possible moment to prevent serious after-effects, even to the extent of death. Friedrich has written a very able article on this subject in V. Bergman's System of Surgery, in which he calls attention to the various serious results that follow procrastination. He also calls attention to the difference in the arrangement of the connective tissue connecting the skin to the fascia in the palm

of the fingers and hand, and in the remainder of the body. Here the connecting fibers are short and arranged vertically, while elsewhere they are longer and unite with the skin and fascia at an acute angle, which allows for greater distention without harmful pressure. This has bearing in the fact that inflammations on the palmar surface spread laterally and deeply, causing necrosis and sloughing much sooner by the increased tension than do similar inflammations on the dorsal aspect. He therefore wisely advises incisions in palmar infections to be made sooner and more extensive than in dorsal infections.

I wish to particularly call attention to tenosynovitic panaritium because of a very instructive case which I encountered. A colored man presented himself with what appeared to be superficial inflammation of the proximal phalanx of the middle finger, with the usual signs of pain, redness, swelling of the finger, etc. I made an incision in the finger, which failed to reveal pus, but which gave instant relief, so that he refused to allow me to go deeper. The wound was dressed in the usual manner, and the next day he told me that he had had perfect relief and had enjoyed a good night's sleep. Examination revealed slight tenderness, but what was more pronounced was the marked increase in the girth of the finger. A knife was introduced into the wound penetrating the tendon sheath, and immediately about a drachm of seropurulent fluid gushed forth. The girth of the finger was promptly reduced to normal, and the case progressed to recovery without further incident. This case emphasizes the fact that the deeper infections can resemble the more superficial ones owing to the tenseness of all inflammations on the palmar surface of the finger and that superficial incisions may give temporary relief without cure because of the release of tension.

Just a few words with reference to paraungual panaritium, or "run around." Upon several occasions, upon my own fingers and fingers of a few of my more intelligent private patients, I have experimented with the Bier method of treatment when the condition had not as yet gone on to pus formation, and invariably with success. I have had only a very limited experience with the method, but thus far none have suppurated. The method used was extremely simple. A rubber band was slid over the finger down on the first phalanx so that it was just tight enough to shut off the venous circulation, leaving the arterial pulsation still to be felt beyond the band. This was allowed to remain on for an hour or two at a time, and was removed for a similar length of time. I once fell asleep with one on, and did not discover it until morning, with no other result than the cure of the panaritium. The finger was allowed to acquire only a dusky reddish hue and never allowed to get pale or blue. The method is so simple that I intend to continue to use it, and will possibly employ it in selected minor infections of the skin before pus formation. It gives quite prompt relief of pain after the first ten or fifteen minutes.

Before taking up the subject of carbuncles I wish merely to comment upon the frequency of the formation of furuncles on the back of the neck and on the wrist, in both of which situations there is both profuse perspiration and dirt, a splendid combination for the promotion of infection of the hair follicles. I believe that the consideration of these two facts gives a good clue to the proper method of preventing the continued recurrence of furuncles at the above sites. Internal medication is of little use. What is much better is to give to those whose occupations predispose them to furunculosis from the above causes prescriptions for bichloride tablets, and let them soak the above mentioned situations with bichloride solution about three times weekly, if not oftener, even after the original infection is cured. This method has been very effectual in my hands.

Carbuncles, wherever located, should be treated in the usual manner of free crossed incisions, curetting thoroughly, breaking down the wall of every sinus, thoroughly carbolizing the interior of the cavity fol-

lowed by alcohol to prevent absorption of the excess, and then draining with continuous wet packing as previously described. Immediate curetting in these cases has not the objections it has in simple infections, for in this condition there is no tendency to localization present, and unless all sinuses are broken down and thoroughly disinfected, the spread will be unlimited.

The above, I believe, include all the more important of the local infections. In conclusion I would summarize as follows:

1. Poultices, so-called antiphlogistics, etc., are useless in the treatment of local infections and do harm by causing greater destruction of tissue and delaying proper remedial measures.

2. Immediate incision over the point of greatest tenderness should always be practiced, followed by carbolization of the wound to destroy the nidus of infection, and then a wet bichloride dressing applied.

3. Free incision with constant wet drainage should be the rule in the presence of pus.

4. Dry drainage, especially when saturated with coagulative powders, is ineffectual and harmful because of the "caking" that occurs on the surface, sealing the cavity.

5. Cases, especially with drainage, should receive soakings with hot bichloride solution thrice daily. Hot salt solution or water may be used if the bichloride appears to be too dangerous.

6. Waxed paper should not be used over wet dressings, as it forms them into moist warm poultices, which are objectionable.

7. Never curette infections primarily, excepting carbuncles, which should always be curetted and carbolized.

8. Gauze selvage, when soaked in bichloride solution, makes a conveniently handled and effectual packing.

9. Palmar infections of the fingers and hands are more serious than dorsal infections.

10. In incising for palmar infections of the fingers, continue the incision until pus or the bone is reached, and do it without delay.

11. The Bier method of treatment appears worthy of further trial, especially in the milder panaritia of the cutaneous or paraungual type.

ASEPTIC OPERATIVE TECHNIQUE.[1]

BY JOHN EGERTON CANNADAY, M.D.,
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Quite a number of hospitals have of course a varying amount of individuality in their methods of technique. Every surgeon who does much work will sooner or later evolve some methods of his own, selecting certain points from the experience of others that may seem good to him, and assembling them after his own fashion, so that in any event he at least owns the string which holds them together. A technique to be satisfactory must be simple, logical, and consistently adhered to. For a successful and harmonious technique in accordance with any plan the instinct of cleanliness should be well developed. Without it the would-be surgeon had best return to pursuits more in keeping with his natural tendencies.

Prior to major operative procedure of any sort I prefer to give the patient a few days at least of preliminary treatment, including a carefully regulated diet, purgatives, and rest in bed. The intestinal tract is in a measure freed of excretory products, intestinal indigestion with its putrefactive and gas-forming concomitants is temporarily held in abeyance, and the individual who may be accustomed to the most active habits becomes habituated to life abed. As the eliminative power of the skin when in a normal state of efficiency is great, considerable attention should be

[1]Read by title before the Mississippi Valley Medical Association, Hot Springs, Ark., Nov. 8, 1906.

bestowed on that organ; skin friction, soap, and a hot tub or shower bath should be given daily for several days, a clean suit of underclothing being put on after each bath. Eczematous conditions of the skin as a rule should be a bar to operative procedure in the affected region. I usually give the patient a quite light or liquid diet the day before operation, no food of any sort the day of the operation unless the patient's vitality is below par, when some form of liquid nourishment is administered to within two or three hours of the anesthetic time. All other factors being equal, the smallest amount of food and feces we have in the gastrointestinal tract at this time the better for the patient. As I usually begin operating about 2.30 P.M., the patient has by that time had ample opportunity to get results from the routine of fasting and the administration of purgatives.

The evening of the day before operation a soap poultice is applied to the operation site and vicinity; this remains for two or three hours, when the part is carefully shaved, then washed with liquid antiseptic soap and warm water, followed by alcohol to remove the residue of soap. During the cleansing process care is taken not to produce abrasions, a soft brush or preferably a gauze pad being used to scrub the skin. In this preliminary skin cleansing a careful aseptic technique should be maintained. A sterile gauze dressing is applied and retained in place by a bandage. As containers for the solutions used in cleansing the skin site, glass flasks of appropriate size having well-fitting rubber stoppers with bent glass tubing are used. This insures a small, steady stream that can be stopped or started at the right time and directed to the desired spot.

A purgative of some sort is given the evening of the preparation and a saline early the next morning. This is followed in two hours by a soap-suds enema if necessary, and later by saline enemas until they return clear. The bichloride compress is not used for the reason that it macerates the epithelium and diminishes the regenerative powers of the skin. The dry dressing is as a rule undisturbed until after the anesthetic has been started, when the final cleansing of the skin is done. Precisely the same technique is observed as in the preliminary cleansing, with the addition of a one-per-cent solution of iodine, which follows the alcohol and is allowed to dry on the skin. The patient is covered by a sterile fenestrated sheet; the operation area is outlined by sterile towels and loosely covered until the operation is begun. It is an easy matter to overdo in our attempts at asepsis. Overzealous scrubbing, too much energy expended in this direction, will defeat the end aimed at. Naturally in emergency cases the preliminary cleansing will have to be omitted. The solution of iodine may be made up with dilute alcohol or in accordance with the appended formula: Iodine, 2.5 Gm.; potassium or sodium iodide, 5.5 Gm.; water, 250 Cc. This gives a 1:100 solution, which can readily be diluted to any desired strength by the addition of water.

Granted that the attainment of absolute asepsis of the skin is about as impossible as squaring the circle, it yet behooves us to try to reduce the bacteria to the smallest possible number to each square inch of surface. In the preparation of the operation site one needs to have an intelligent appreciation of the possibilities of skin infection and the consequences of the same. As the complete sterilization of the skin with our present crudeness and limitations of science is a futile impossibility, we have to make the best use of the opportunities at hand. The value of the iodine solution as a germicidal agent for streptococci and staphylococci has been bacteriologically proven beyond a doubt; clinically this method has been productive of the happiest sort of results, and it is easy to conclude that as a chemical agent for at least the partial sterilization of the skin iodine is the most satisfactory substance we at present possess.

For purposes of mere mechanical cleansing of many of the mucous membranes

of the body prior to operation I have the parts copiously flushed with physiologic saline solution. Urinary antiseptics are used to improve the sanitary condition of the urinary tract. A dilute solution (1 to 1000) of iodine is used to irrigate the vagina and uterus. The cleansing of the vagina is a subject often neglected; a careless sort of douche is given, and the part is said to be clean. Every part of the vaginal wall should be carefully cleansed with liquid antiseptic soap, hot water, and a thorough scrubbing with a gauze pad. Especial attention should be paid to the space just behind the cervix, where discharges are prone to accumulate and entirely escape the average douche. Alcohol causes too much burning for use on the mucous membrane even of the vagina. The soap should be removed by free use of warm water; thereafter the dilute iodine solution should follow.

The teeth and mouth of both operator and nurse as well as patient should be kept in the best possible condition in order to guard against such potent sources of infection. Regular visits to the dentist and the frequent use of a tooth-brush with or without some good mouth-wash are the requisites of common decency.

The presence in the operating room of an individual suffering from ozena, alveolar abscess, or other suppurative conditions, nasal catarrh, coryza, inflammatory conditions of the pharynx or tonsil, bronchitis, or pulmonary tuberculosis is a menace to the patient.

Upon the hand of the surgeon much depends. A large, fat hand is a serious handicap. While the size of the hand cannot well be regulated it can at least be well groomed. Great care of the hands should be taken; they should never become abraded or chapped. Gloves should be regularly worn out-of-doors for their protection. The fingers should never be contaminated with pus or soiled dressings. All hangnails should be removed with cuticle scissors; if the cuticle is well pushed back from the base of the nail every day or two these will seldom form. Keeping the nails short by the frequent use of the file is better than frequent cutting with knife or scissors, which tends to make the nails become brittle and split. The metal nail cleaner should not be used to remove the accumulations of dirt under the nails, but the orangewood stick, which produces no abrasions, should take its place. When the nails are to be cut they should first be softened by soaking in warm water. Cracks, fissures, or roughened places on nails or hands act as nidi for dirt and promote infection.

Just prior to operation the hands are washed thoroughly with green soap and running hot water. All collections of dirt are removed from under the nails. After the washing is resumed the ends of the fingers and the palmar surfaces of the hands are scrubbed with a Tampico nail-brush; the forearms, the backs of the hands, and the spaces between the fingers are systematically scrubbed with a towel during the cleansing process, care being taken to miss no part. The stiff nail-brush ordinarily used is apt to produce slight abrasions on the arms that may be a source of infection. The hands and arms are then washed thoroughly in 70-per-cent alcohol and rinsed in sterile water. Antiseptic solutions are not used for the reason that they irritate the skin and give a false sense of security.

Rubber gloves are worn as a part of the regular routine in all operative work, obstetric cases, vaginal and rectal examinations, etc. I have never been able to subscribe to the German custom of having the hands bare and wearing rubber boots or overshoes in the operating arena. Among the disadvantages of gloves as enumerated by those who oppose them I note expensiveness, short life, masking of tactus, and the slipperiness of gloves. Among the advantages I mention the protection of the surgeon and the patient from infection by the intervention of a germ-proof, easily sterilized cover for the hand. The contact of the glove with the intestinal peritoneum is less irritating than the bare fingers. The cost of gloves is of

course considerable, but is small when compared with the benefits to be derived from their use. By taking good care of gloves and by mending those punctured or torn the cost can be somewhat lessened. The sense of touch is practically unimpaired for those who are accustomed to their use. After wearing them several hundred times one arrives at such a degree of facileness in their use that the fact that gloves are being worn during the operation is scarcely noticed or thought of. It has been proven by scientific tests that the interference of gloves with the delicacy of touch is most infinitesimal. By the interposition of gauze one layer in thickness between the gloved finger and the viscus being held all sense of slipperiness is done away with; or if one wishes, slightly roughened gloves can be worn.

Dry gloves are used in all of our cases; as a rule they are sterilized by steam; if by chance they have to be boiled they are protected from the sides of the vessel by being wrapped in a towel. When taken out they can be dried between sterile towels and dusted with sterile talcum. As a damp or wet glove is troublesome to put on care should be taken to have the gloves well dried out. After the hands have been well scrubbed as previously described, they should be dried with a sterile towel and well dusted with sterile talcum shaken from a sterile container; the gloves are then drawn on. In putting on gloves the chief object to be attained is the getting on of the glove without touching its outside by the skin of the hand or the fingers or any surface that might cause contamination. The right-hand glove is picked up by the thumb and the finger of the left hand at the point of turning of the backward fold (the gauntlet part of the glove has been turned backward prior to sterilization in order to facilitate the technique of putting on the glove) of the gauntlet, and the glove is drawn on, a gentle but steady pull being made to prevent tearing. Then the square of sterile gauze in which the right-hand glove has been wrapped is spread over the palmar surface of the right hand covering the tips of fingers and thumb; with the gauze-enveloped right hand the left-hand glove is picked up by the turned-down cuff and drawn on. Thus the outside of the right-hand glove is protected from contact with the skin of the left hand or wrist. Then the turned-down cuffs are pulled up over the tightly buttoned wristband of the long-sleeved gown. This method properly carried out insures a sterile pair of prehensile organs.

The gowns worn have long sleeves which may be buttoned closely about the wrists. If a glove is torn or becomes contaminated during operation (this should happen seldom) a clean glove should be substituted at once. If a finger is punctured a sterile finger-cot should be slipped on over it. Dry gloves are much easier to put on than wet ones. The sterile talcum next the skin absorbs a certain amount of perspiration. By the use of wet gloves the skin of the hand is not only macerated, but if a finger is punctured a solution of dead epithelium, water-infected perspiration, etc., will at once be poured into the wound.

As previously stated, long-sleeved gowns are worn. If the arms are bare and gloves are worn it is clear that the purpose of the gloves will be defeated, for the arms must necessarily come in contact with the hands and instruments or even the wound itself. Attached to each gown in front at the neckband is a piece of gown material four or five inches wide and long enough to come up over the mouth and nose to the level of the eyes. This mask is secured by tapes passed above the ears and tied at the back of the head. This device not only acts as a guard to stop the outward passage of particles of saliva expelled by breathing and talking, as do the strips of gauze or the face mask ordinarily used, but being a continuation of the gown it prevents epithelial scales and perspiration from falling where they should not. A cap is worn that covers the hair entirely and

can be tied with tape to fit snugly. As a possible precaution against falling particles the cap is put on before the gloves are.

Green soap is used for the hands. This is sterilized by boiling, and is kept in a telescoping container which protects its contents from contamination by exposure to the atmosphere. Sterilized green soap made into a freely flowing fluid by dilution with alcohol and ether is used in the preparation of the skin of the patient.

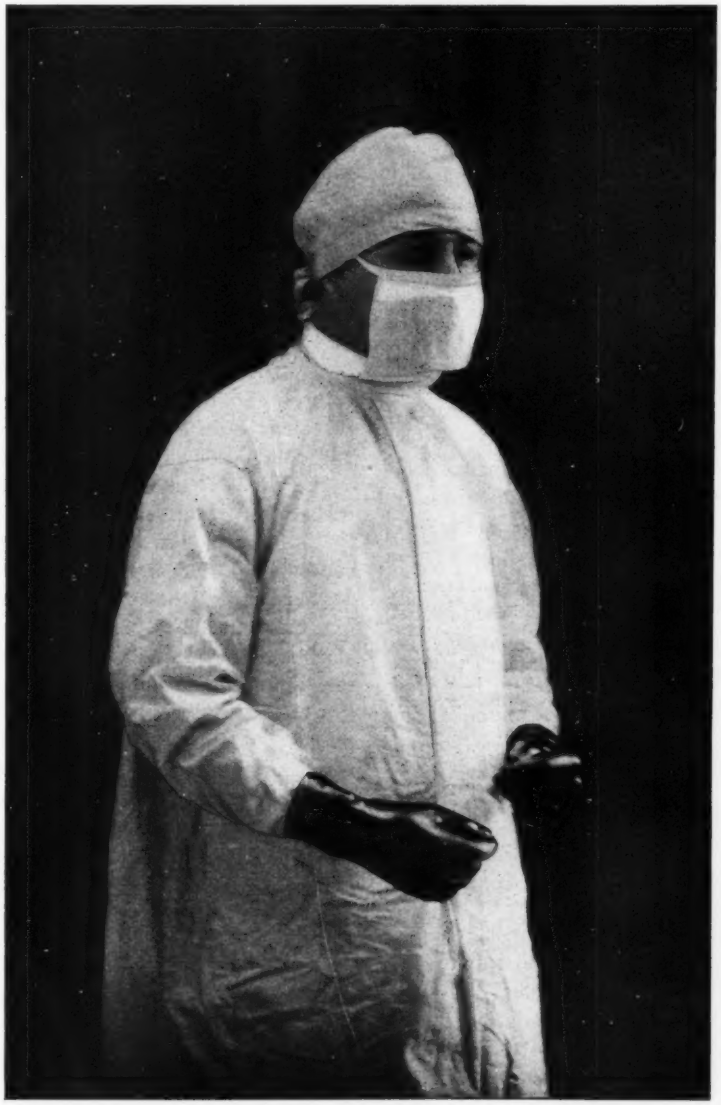
Nail-brushes are boiled and kept in sterile containers. The usual custom of keeping brushes in bichloride solution is unsatisfactory, as the brushes rapidly become softened and unfit for use. The usual Tampico fiber brush is ordinarily used, as it is cheap and effective.

Putting on first glove.

The number of instruments is limited to the smallest number with which the work can satisfactorily be done. A large number of appliances are a hindrance rather than a help to clear-cut and direct methods. The operator who knows the uses of a few good instruments well and is deft with his fingers can do rapid and easy work. Instrument trays are not used; the instruments are taken directly from the bicarbonate of soda solution in which they are boiled and laid on the instrument table, which has been covered by sterile towels. The instruments, being hot when laid out, are speedily dried by their own heat. An adjustable table which extends over the body of the patient is a great convenience.

Putting on second glove

Wounds are made as short as is consistent with good work. The general direction of muscular fibers is followed, and separation with displacement rather than division practiced wherever possible. In going through the abdominal wall, the scalp, or other soft tissues I frequently use sharp-pointed scissors to the exclusion of a scalpel. Easy and accurate division is insured, the bleeding is not so free as when a sharp knife is used, and the number of instruments is lessened. A small opening is made in the parietal peritoneum, and this is stretched rather than cut to the requisite size. Before making the opening the peritoneum is separated with the finger from the superimposed structures for a short distance on either side;



Arrangement of face mask.

this makes the peritoneal suturing much easier. The various points at which pathological changes are commonly found are inspected systematically as a regular routine. Blood or other fluid is removed by dry sponging, and irrigation is seldom resorted to. Bleeding is controlled by temporary pressure with hemostats, by torsion of the vessel end, or by individual ligation of the arterial branches. Ligatures are seldom applied to structures *en masse*. Catgut is used exclusively as a ligature material. Unnecessary conversation is avoided. As nearly as possible the same system is followed in each operation in order that nurses and assistants may become habituated to a certain routine, and thus be enabled to anticipate the various steps of the operation.

For all internal and buried sutures I use catgut; plain for all peritoneal work; 10-day, chromicized, for closing a perforation or the inversion of an appendix stump; 20- or 30-day for fascia and hernia; and 30-day for bone. The catgut used is put up in sealed glass tubes by a house of undoubted reliability, or is the iodized catgut in ordinary use. I invariably use silk for the skin; this is prepared by boiling in a 1:10,000 solution of bichloride to render it inimical to whatever germs it may have collected in its passage through the skin. For simple interrupted coaptation or tension sutures silkworm-gut is used; this is dyed red for negroes and blue or black for whites; the color contrasts make the stitches easy of removal and at times obviate the possible danger of a lost suture with its small suppurating sinus. For gastroenterostomy, intestinal anastomosis, and similar work the Pagenstecher linen thread is most valuable; it does not act as a wick to carry infection, it is of great tensile strength, and is easily handled. For the coaptation of external wounds silkworm-gut or horsehair is generally used. Whenever possible I dispense with all sutures that puncture the skin and use a subcutaneous suture of plain catgut. The number of cases of wound infection will be lessened by the observance of this technique.

When the condition of the patient permits the necessary time to be taken the incision wound is sutured in layers. The parietal peritoneum is united with 10-day catgut. Next the fascial edges are approximated by a continuous suture of 20-day catgut, an interlocking stitch being taken at every third or fourth stitch to prevent a possible slipping in case either end should become loosened. Sutures are necessary evils, and we must use them carefully in the approximation of tissues, avoiding as far as possible strangulation even of small masses of tissue with the possibilities of slight necrosis and stitch infection which may follow overtight tying of sutures. After peritoneal fascia and skin have been securely approximated atmospheric pressure may be trusted to for the prevention and obliteration of dead tissue spaces.

Drainage is a crude, imperfect, and barbaric procedure and a mechanical insult to the tissues. In a few clearly defined conditions I find it necessary and use it. In clean cases where free extravasation of blood or serum is expected, as after the closure of some scalp flaps, operations on the kidney, some amputations, removal of the breast, and retrenchment of the scrotum, a few strands of silkworm-gut left in twenty-four hours are effective and do but little harm. In infected cases I drain abscess cavities or localities where a portion of an abscess wall may of necessity be left behind, and where there is danger of leakage from the urinary or gall-bladder. In this class of cases I use two varieties of drainage material—rubber tube or the gauze drain partially enveloped with rubber dam in cigarette fashion. In general peritonitis the methods of drainage often resorted to are worse than valueless. Any form of drain will be walled off and inert in six hours, availing nothing but the production of a multiplicity of adhesions. If there is any localized collection of semipurulent fluid, a simple incision allowing its escape without the intervention of gauze, glass, or rubber tube drainage will

be effective. It has been said "when in doubt drain;" when in doubt I do not drain, and feel that I have not gone far wrong in such matters. I have sutured gunshot wounds of the stomach and bowels as late as thirty-six hours after receipt of injury, and had perfect recoveries without the use of either irrigation or drainage.

Irrigation of the peritoneal cavity is one of the greatest misconceptions ever fathered on a profession. If I wished to shock a patient profoundly I would open the abdomen of a case of peritonitis, irrigate thoroughly with salt solution, and practice drainage through multiple incisions. I remove blood, serum, escaped fecal matter, etc., by dry sponging, then close the abdomen. The peritoneum can safely dispose of a considerable amount of toxic material if not hurried and left to handle it in its own way. Irrigation even with salt solution irritates the peritoneal tissue, scatters widely all toxic material, promotes absorption, and puts the patient in immediate danger of being overwhelmed by an excessive amount of poison.

A dressing of absorbent gauze and cotton is placed over all wounds and held in place by adhesive strips. We formerly used a collodion dressing, but this may retain perspiration—especially in warm weather—and may in that way bring about wound infection. If the gauze remains dry and there is no reason for believing that the wound is not in good condition, the dressings are not disturbed until the tenth or fifteenth day. In drained cases the dressings are changed as often as saturated. In the dressing of wounds strong solutions of antiseptics are not used. The dressings if caked are softened with warm saline solution. Peroxide of hydrogen acts as an irritant to the tissues and is seldom used. Wound secretions are removed by irrigation with saline solution. If suppuration is free or persistent a weak solution of iodine, 1:1000, is used for irrigation. Raw surfaces are protected with strips of rubber dam sterilized by boiling. The granulations grow through the meshes of gauze and are torn off when it is removed. Wounds are not fingered when dressed, such proceeding being neither good for the fingers nor the wound; knife-and-fork dressings are done as far as possible.

After laparotomies a laxative of some sort is usually given about the third day. After operations on the rectum or perineum the patient is fed small amounts of albumin, which leaves but little residue, and the bowels are kept locked from ten to sixteen days with perfect impunity. The bowels in such cases are moved with the patient lying on the side to prevent the damaging effects of undue straining.

My conclusions in regard to the subject of operation technique are:

That bichloride of mercury as ordinarily employed is useless and engenders a false sense of security.

That the bugaboos of prolonged scrubbing of hands and arms with rough brushes and the reckless use of strong bichloride solutions favor rather than diminish the chances of infection in the long run.

That the iodine solution is comparatively non-toxic and highly antiseptic. Laboratory experiments have conclusively proved that as a germicide a 1:500 solution of iodine will do in five minutes what it takes a 1:1000 solution of bichloride half an hour to accomplish.

That persistent care of the hands and the wearing of gloves is of prime importance: to protect the patient from the operator and to protect the operator from the patient. The objections are slight as compared to many advantages accruing from their use. Face masks are advantageous in the prevention of wound infection. Long-sleeved gowns are indicated for the sake of consistency in technique.

That irrigation and attempted drainage of the abdominal cavity are as a rule inadequate and harmful.

That whenever possible unabsorbable buried suture material should be avoided.

That the evils of drainage are many

and the indications for its use are few. When in doubt do not drain.

That Kelley's method of starvation diet to prevent the formation of scybalous masses that might tear newly united perineal tissues, and of locking the bowels for from ten days to two weeks to allow ample time for healing after plastic operations on rectum and perineum, has many advantages.

GASTRIC CARCINOMA—BACTERIOLOGIC DIAGNOSIS.

It is claimed by PALIER (*La Presse Médicale,* No. 99, 1906) that the combination of certain bacteria in the gastric contents removed by lavage permits an absolutely certain diagnosis of cancer. Negative results render the diagnosis of cancer unlikely, while partial results are of less value.

To make the diagnosis certain, three characteristics must exist coincidentally, namely: (1) The absence of yeasts and molds. (2) The presence of cocci, either staphylococci, streptococci, or diplococci, even in small number. (3) The presence of long, wavy chains composed of bacilli united by their ends at a slight angle. These have been known as the Boas-Oppler bacilli, but the name bacillus geniculatus would be more appropriate on account of the angular joints where they unite. The presence or absence of other bacilli has no influence on the diagnosis.

After a test meal the stomach is washed out and two tubes are inoculated, one of glucose-gelatin for the molds and yeasts, and one of plain gelatin for the bacteria. These are kept in the incubator forty-eight hours and then examined. The growth in the glucose tube can be determined with the naked eye, but it is necessary to make smears from the sediment in the other tubes, and to stain them by Gram's method and eosin. The bacillus geniculatus is stained by Gram, and if it is found together with stained cocci and there is no growth in the glucose tube, the diagnosis of cancer is certainly correct.

THE TREATMENT OF GONORRHEAL ARTHRITIS.

In the *Journal of the American Medical Association* of February 2, 1907, WITHERSPOON says that treatment is as varied as it is unsatisfactory. In the acute types rest in bed should be ordered, and fixation of joint by splints to relieve pain, which may be so severe as to demand an opiate. In England they insist on large doses of quinine. Local applications, hot or cold, are often grateful, one of the best local applications being a 50-per-cent ichthyol ointment early in the case. Internal administration of drugs rarely influences the trouble, and is not advisable, except to meet symptomatic conditions. The salicylates are harmful, and add to the patient's discomfort by disturbing the stomach, and yet they are almost universally given. In chronic cases general reconstructives are useful, and potassium iodide. In both the cure of the initial lesion is to be recommended as rapidly as possible.

The author does not agree with the writers who condemn all surgical interference. Great benefit is often derived, according to the case. In some, strapping the joint with adhesive plaster, being careful not to surround the whole joint, will give relief; in others, aspiration must be advised; and in suppurative cases incision and drainage is the only treatment.

Some very remarkable cures have been reported by Fuller, who insists that the infection comes from a gonorrheal vesiculitis, and by opening and draining immediate amelioration of the arthritis takes place. With regard to this the author can speak only of one case. The case was of two years' duration, and great emaciation and general bad health existed. Both knees were swollen and painful. Much relief followed the operation, and rapid improvement of the arthritis was noted in a few days. In view of the pathology in the joint and the presence of the infective agent found in the effusion, it is difficult to explain the rationality of this treatment.

EDITORIAL.

THE TREATMENT OF VARIOUS FORMS OF HEADACHE.

The recognition of the fact that headache is purely a symptom and never a disease is essential for the successful care of patients who suffer from this frequent malady, and the administration of the very large number of pain-relieving drugs which are now before the profession is of little value in the majority of cases if the underlying cause of the attack of pain is not removed as soon as possible by other measures of a more permanent nature, and of a character which will get at the deeply seated factors in the case.

There are two forms of headache to which the term "rheumatic" is sometimes applied, although the term "gouty headache" is also used to describe them. In one of these the pain is distinctly neuralgic in character, and frequently limited to the distribution of a single nerve, as the supra-orbital branch of the fifth. The other type of headache of this character, sometimes called myalgia capitis, involves the muscles of the scalp, the temporal and frontal muscles, and even extends to the trapezius muscle as well. This headache may be unilateral or bilateral. Although both may be relieved during the acute attack by the ordinary coal-tar products, they are best cured by outdoor exercise and the use of the salicylates, the iodides, and Turkish baths. In some instances hot compresses give relief in the acute attack.

Syphilitic headache, which is so often of a dull character, or, in other instances, exceedingly severe, the so-called "crashing head pains" of syphilis, cannot be relieved, as a rule, by any of the ordinary pain-relieving drugs, and full doses of morphine may be necessary. It goes without saying that active antisyphilitic treatment with the iodides or mercury is needed in such a case. It must be remembered, however, that these syphilitic headaches may be due to the disease involving a number of tissues. In some instances it is a syphilitic periostitis, in others syphilitic meningitis or cerebritis, and in still others it is due to the growth of the gumma which produces pain by pressure, in which case pressure symptoms, and all those of brain tumor, will probably be present.

In that type of headache which depends for its existence chiefly upon nervous exhaustion, rest in bed with massage, the administration of tonics, and the support of a tired heart by small doses of digitalis are usually advantageous. In many of these patients as soon as they become strong enough to react, hydrotherapeutic measures are exceedingly advantageous. In the early stages if there is cerebral congestion, a general hot pack, and an ice-bag applied to the head, may be useful. Afterward a cold drip-sheet may be thrown around the patient for a moment.

Headaches of the migraine type depend, in the majority of instances, upon some form of autointoxication. In some instances this autointoxication is gouty or lithemic in its nature, when of course the salicylates are advantageous; or in others it depends upon the absorption of toxic materials from the intestine and upon hepatic inactivity, not only in the secretion of bile but in the carrying out of that most important function of the liver, the destruction of poisons which may be absorbed from the alimentary canal. Such cases usually require some intestinal antiseptic, such as the sulphocarbolate of sodium, or guaiacol, the hurrying of digestion by the use of pancreatin and taka-diastase, and the use of small doses of calomel or podophyllin to stimulate hepatic and duodenal secretion. In many cases the attack is best arrested by the adminis-

tration of a brisk saline purge followed by the use of one of the coal-tar products associated with the bromides and caffeine, or, if the circulation is excited, or the arterial tension high, by substituting gelsemium for the caffeine. Occasionally, neuralgic or migraine headaches are dependent upon carious teeth or nasal disease, and in this connection violent pain in the face and forehead, coming on in the course of influenza and acute colds, should always be considered as being possibly due to infection of an antrum, relief only being obtained when the involved antrum is properly drained.

Uremic headache often gives warning for several days before severe uremia develops. Too often, however, its warning note is not recognized until more grave symptoms develop. The patient should be at once put to bed, warmly covered, his skin kept active, and if his heart is strong enough a hot pack should be administered, with cold applied to the head, and the use of large doses of caffeine if the kidneys are not irritated and the circulation is not bounding.

There still remain to be considered the headaches which are due to eye-strain, which are to be relieved by the fitting of proper glasses, the headaches which arise from arteriosclerosis, and those which also develop as the result of perverted metabolism associated with marked phosphaturia. In connection with the subject of proper glasses it is surprising to find how frequently headaches continue not because the oculist has not ordered the proper glasses, but because the patient wears the glasses improperly, or in the course of time so bends the frame that the erroneous adjustment of the glass renders the condition worse than before.

In the arteriosclerotic cases the use of the iodides and nitroglycerin to diminish tension is essential. In those forms which are due to vasomotor disorders, hydrotherapeutic measures are best, whereas those headaches which arise from gastrointestinal catarrh are to be treated by the use of alkalies, bitter tonics, and digestives.

THE TREATMENT OF MALARIA.

With the discoveries which have been made during the last few years in regard to the manner in which malarial infection is spread, the importance of treating the individual paroxysm of malarial fever by the administration of quinine has been equaled and surpassed by the measures which are essential for the protection of the well, so that they will not fall victims to the disease. It is no longer sufficient to administer calomel and quinine to such patients with the idea of destroying the parasite in the blood. The quinine must be given not only to protect that individual from the influence of the parasite but to protect other individuals, since as long as the parasite remains in his blood it is possible for the mosquito to transfer the infection to another person, and as Krauss points out in an excellent article in the *Journal of the American Medical Association* of March 16, 1907, it is quite as essential for the stamping out of the malarial epidemic that the patient shall be put to bed and protected by mosquito-netting as that this plan of treatment shall be instituted for the prevention of the spread of yellow fever. If patients suffering from this disease are isolated in this manner, if persons exposed to mosquitoes are careful to protect themselves by netting, if pools and other places in which the Anopheles can breed are eradicated, it becomes entirely possible not only to cure but to prevent malarial infection. This being the case, it is important that every physician should bear in mind that the disease is absolutely preventable, and indeed is much more readily prevented than diseases which are propagated by bacteria like those of typhoid fever and pneumonia. It has been said that every death from typhoid fever is a manslaughter, since had the discharges from another patient been properly disinfected infection would not have taken place. In many parts of the country the mortality from malarial infection is quite

equal to that produced by typhoid, and therefore prophylactic measures are to be carried out vigorously, and if carried out give promise of equal possibilities of preserving health and life.

THE SALT-FREE DIET FOR DROPSY.

On a previous occasion we have called attention in the editorial columns of the THERAPEUTIC GAZETTE to what is sometimes designated the dechlorization treatment of dropsy, which consists in excluding from the diet to the greatest possible extent ordinary table salt. It will be remembered that the theory upon which this treatment is based depends upon the fact that the kidneys in certain cases of Bright's disease are unable to eliminate the normal quantity of salt, with the result that an excess of salt accumulates in the tissues, and in order that the juices of the tissues may have the proper molecular concentration very considerable quantities of fluid are extravasated. If in such a condition the patient receives a diet which carries into his system very little salt, the kidneys constantly eliminating salts in small quantities, a condition arises in which the molecular concentration falls, there is no longer any need of fluid in the tissues, this fluid is rapidly absorbed, carried to the kidneys by the blood-vessels, and so eliminated, particularly if at the same time moderate saline purgation is used and diuretics like caffeine, theobromine, or digitalis are employed. It is noteworthy that this plan of treatment is of practically no value in cardiac dropsy, in which condition the tissues are not laden with an excess of salt, but are dropsical because of circulatory failure. On the other hand, in a large proportion of cases met with in actual practice, both cardiac and renal lesions are associated, and therefore the salt-free diet may prove advantageous. We have employed this method in a few cases with apparent advantage, although we have not been impressed with the idea that it possesses extraordinary abilities to relieve anasarca.

In the *Medical Record* of March 9, 1907, Dr. Peabody contributes an article upon this subject in which he gives the result of his own experience with the employment of this plan of treatment, an experience which leads him to speak of it in terms of commendation. As he well points out, it is almost impossible to administer a diet which is absolutely salt-free. The first thing, of course, is to prohibit the patient from using salt with his food, and secondly, to see that in the cooking of his food salt is not added during that process by the cook. The diet can be almost as liberal as that which is allowed the ordinary healthy individual if this precaution is taken, and the following list, suggested by Peabody, may be employed with advantage:

Breakfast: Coffee or tea, eggs, cereals, cream, fresh butter, fruits, bread made without salt.

10 A.M.: A glass of milk.

Dinner: Chicken, fish, potato variously prepared, bread made without salt, ice cream, jelly, fresh butter, cocoa ℥viij.

3 P.M.: A glass of milk or water.

Supper: Eggs, chicken, bread without salt, jelly, custard, cream, fresh butter, tea ℥viij.

8 P.M.: A glass of milk or water.

After the anasarca has diminished to such an extent that it is no longer manifest, it is not proper to maintain the absolutely salt-free diet. Small quantities of salt may be allowed until evidences of edema are once more developed, when the salt should be once more stricken from the diet list. It is well to remember that one of the best ways of determining that a patient is rapidly using an excess of fluid is not alone to measure the quantity of urine passed, which often depends to a large extent upon the amount ingested, but to weigh him, any marked loss in weight being an excellent criterion of the quantity of fluid which is being lost from the tissues.

THE DIAGNOSIS OF TUMORS—THE RESULTS OF OVERCONFIDENCE AND DELAY.

Anything which Richardson writes is well worth the careful attention of the entire profession. Perhaps he can teach no lesson of greater importance, in so far as the lessening of human suffering and preservation of life are concerned, than that found in his contribution to the *Boston Medical and Surgical Journal* (vol. lvi, No. 110). He notes that even with our improved facilities the diagnosis of tumor is at the present day uncertain in the hands of the most experienced—from which it results that many unnecessary, not to say unjustifiable, operations are performed, while many imperative ones are withheld. Richardson states that he has been long deeply impressed, and during the last few years even more so than before, by the evils which follow the overconfident diagnosis, whether of malignancy or benignancy. Clinical histories are crowded with tumors in their early and operable stages and their worse than useless treatment by "absorbents," "counter-irritants," trypsin, and other newly-discovered and much-advertised "scientific" methods of sure cure. In some instances, but too few to be in the aggregate of serious moment, his operative records contain the pathologist's report of benignancy when the operative diagnosis read malignancy.

In the diagnosis and treatment of tumors the most desirable because the most beneficial propositions may be expressed as follows:

All tumors should be regarded as malignant until they are proved benign.

No tumors can be proved benign while they are still in the body.

Therefore all tumors should, if possible, be removed.

The demonstration of this proposition, based on huge clinical experience, is almost complete.

The breast tumor cannot at any age, and especially after the age of thirty, be diagnosticated as benign with an accuracy sufficient to permit indefinite delay. Although in young girls malignant disease of the breast is unusual, Richardson has seen the most malignant form at nineteen. Because of the rarity of cancer in the young its presence is apt to be overlooked. This is especially distressing since the disease runs in young women a singularly virulent course. It is noted that some regions are so commonly the seat of malignant growths that the region itself may add the decisive evidence in favor of extirpation. The tongue, pylorus, and esophagus are included in this group. In fact the whole alimentary tract is the seat of malignant so much more frequently than of benign growths that the general rule of universal extirpation, when possible, is applicable. It is conceded that the individual operator would find it difficult to collect from his records a half-dozen benign neoplasms from the whole alimentary tract; hence the surgeon must be especially careful and sure of his diagnosis before he advises non-intervention in tumors which, from their situation alone, are likely to be malignant.

Richardson believes that cancer of the lip is by nature no more curable than cancer of the pylorus, the cervix uteri, or the anus. It is taken early because its presence cannot be ignored, and hence the prognosis is extremely good.

As to pelvic tumors Richardson holds that the correct diagnosis of the great majority is comparatively easy, whilst the correct diagnosis of some is beyond human power. The mistakes made in a hundred consecutive cases will be very small. To narrow still the margin of error we must admit our fallibility and uncertainty. Were it not that the commonest source of error is the malignant ovarian tumor, the importance of exploring every doubtful case would not be so great. Were it not that many a uterine hemorrhage is dependent upon concealed cancer of the uterine body, it would not be so important to operate upon what seems to be a simple submucous fibroid or a uterine polyp. Were it not for the frequent occurrence of cancer of the

cervix, it would not be necessary to regard every doubtful cervix as the probable beginning of malignant disease.

Richardson closes his paper with the following conclusions: The failure of the patient to consult the physician early; the delay of the physician to recommend the surgeon; the surgeon's late recognition of malignancy; the surgeon's half-hearted operation—these sources of failure will be, to some extent at least, done away with. Instead there will be early resort to the knife, with a faith on the part of the operator that the broadest practicable dissection of a neoplasm means total extirpation of the disease and permanent cure.

Hopeful as we all are of any easy and effectual destruction of malignant disease without resort to surgery, Richardson does not believe that so great a boon to humanity is in store for us. He has seen too many dismal failures follow loudly heralded methods of cure, whether of tubercular or of malignant disease. Not that there may not be made at any time some discovery the wonders of which will surpass the imagination—like the *x*-ray, for example—but in our hopelessness of such a splendid achievement we must not lose faith in our present methods, which, uncertain and discouraging as they are, have possibilities of brilliant success.

ENUCLEATION OF THE PROSTATE.

Freyer (*British Medical Journal,* March 9, 1907), who may be regarded as the high priest of suprapubic prostatectomy, if he is not the originator of this operation, has been so conspicuously before the profession as the champion of the transvesical route, and has published results so excellent, that a further contribution based on a series of 119 cases is worthy of more than passing notice. From September 6, 1905, to July, 1906, he has operated on this number, of which 30 were in hospital and 89 in private practice. The age of the patients varied from fifty to eighty-six years, the average being 68¼ years. The prostate weighed from half an ounce to 9¼ ounces, the average being a little over 2½ ounces.

In connection with these 119 operations there were 9 deaths, the remaining 110 cases having been completely successful. One died from jaundice on the fifteenth day, there having been a complication of malignant disease of the liver; one died from pulmonary embolism on the fifth day; one from shock seven hours after operation; and six from uremic symptoms from three to thirty-nine days after operation. There was one consecutive series of thirty-nine operations without a death.

Freyer seems to have refused operation in no instance, although preliminary drainage of the bladder was practiced where it seemed needful. By careful elimination of the cases which did not die as a direct consequence of the operation his mortality record will be reduced almost to the vanishing point. The rate as it stands is distinctly higher than that of perineal prostatectomy.

FOREIGN BODIES IN THE BRONCHUS.

In a recent number of the THERAPEUTIC GAZETTE there was reported the removal of a foreign body from the bronchus by means of a bronchoscope, together with reference to other successful cases. When the difficulty and danger incident to a surgical operation for direct access to this portion of the air-passages is remembered it will be conceded that an instrument so devised that access may be gained and clear vision procured without operative procedure will fill a most useful purpose.

Large (*Cleveland Medical Journal,* March, 1907) reports the case of a man twenty-eight years old who inspired a peanut into his right bronchus. Nineteen days later the trachea was anesthetized with a 20-per-cent cocaine solution. The patient was placed on a low stool with the head thrown well backward, and a tube was inserted into the larynx. This tube, which was 13½ inches long, enabled the

operator to see the foreign body lodged in the bronchus and enveloped in thick mucus. On grasping with forceps it broke off and was removed in four pieces. The patient went home the next day and developed pneumonia, from which he recovered. During the operation no blood was seen and the patient had no pain.

The instruments employed are so simple, the technique so readily acquired, that there seems no reason why this method of procedure should not be generally known and practiced.

DIRECT TRANSFUSION OF BLOOD.

There are few researches in the realm of experimental physiology which give greater promise of usefulness both to the surgeon and the physician than those of Crile and his associates Lower, Dolley, Hitchings, Lenhart, and Eisenbrey. Crile and Dolley seem to have established the fact that normal blood of animals of the same species is physiologically interchangeable. The technique of this interchange—*i.e.*, by suturing the artery of the donor into the vein of the donee—is so well established that it has become comparatively easy of execution, and Crile now reports a number of cases in which the method was given clinical trial.

In the first case reported of advanced pernicious anemia, with a red count of 875,000 and hemoglobin 15 per cent, transfusion was followed by a temporary improvement in both the physical well-being and the blood picture. Acute dilatation of the heart followed, and within five days the new blood had disappeared and the disease progressed steadily until death.

The next reported case was one of splenomyelogenous leukemia which had resisted a carefully executed medical course and the *x*-ray. This case was first bled and then transfused. There was temporary marked gain in vitality manifested by an increased well-being, appetite, and strength. The blood picture of leukemia, however, showed no change, though the spleen became gradually smaller. There was no evidence that the natural history of the disease was modified.

The third case, one of carcinoma, was transfused for the purpose of controlling cholemic hemorrhage, the gall-bladder having been invaded by cancer. The transfusion produced no improvement in the malignant disease.

In four cases of chronic suppuration transfusion was practiced for the double purpose of lessening the anemia and supplying better fighting leucocytes in extremely reduced and anemic cases of prolonged intractable suppurations. Although there was distinct improvement in vitality and general well-being the improved blood picture did not continue as in transfusion in certain other diseases, nor was there a noticeable improvement in the local suppurative field.

One case of tuberculous pleuritis and peritonitis, in which laparotomy and drainage of the chest had been performed, exhibited after transfusion a marked improvement of the general state, in appetite and in strength. The improved blood picture was maintained. The latest observation showed that the disease was not progressing and that general health and strength were improving.

It is noteworthy that transfusion exercised a potent influence in controlling hemorrhage. Thus the case of carcinoma of the gall-bladder to which allusion has already been made, and which exhibited hemorrhage from the bowels, uterus, and nose, as well as subcutaneous bleeding in many parts of the body, was subjected on the day following transfusion to exploratory operation, nor was this followed by any unusual hemorrhage. Moreover, four cases of chronic hemorrhage from the bowels, the first exhibiting hemoglobin 15 per cent and a red count of 1,200,000, were cured immediately by transfusion. With a view of transferring immune or protective bodies Crile flooded the vessels of a patient pulseless from typhoidal bleeding with the blood of a young muscular 225-

pound subject who had had typhoid fever. The donee was brought from a condition of clammy unconsciousness into a state of glowing jocoseness, but the hemorrhage recurred in two days and the patient died. In another such instance Crile would advise immediate laparotomy and an attempt to secure the bleeding ulcers by a cobbler stitch.

The clinical trial of the effect of transfusion in shock was applied in the form of prevention in the case of an elderly patient who for five years had been losing blood on account of so-called essential hemorrhage of the kidney, and had become so anemic and reduced as to render him unsafe even for anesthesia. Transfusion was practiced prior to operation. This so raised the vitality that the patient was a good surgical risk and readily endured nephrectomy. As an instance of the value of the transfusion in the treatment of shock a case is reported of prolonged infection and suppuration of the retroperitoneal pelvic space with multiple abscesses, laying bare the sacrum and dissecting up the rectum and sigmoid. The patient was so anemic and reduced that it was not considered safe to give ether. Under nitrous oxide and oxygen a vaginal incision was made and the separate foci converted into a single cavity for drainage. The manipulation was followed by grave shock. The pulse became imperceptible, and the heart was beating at the rate of 186 per minute. During the five hours following she was under vigorous treatment; 1000 Cc. of saline solution was given, and the usual measures were pushed to the extreme. The patient gradually sank. Transfusion was then practiced. At the beginning of the transfusion the pulse could only occasionally be palpated at the wrist, the respirations were 12 and very shallow, the second heart sound was lost, and the eyes were set. Under the influence of transfusion the patient gradually came out of this precarious state and regained consciousness, and was distinctly stronger than at the time of entrance into the hospital. Following this there was no circulatory relapse. This patient finally died of exhaustion eighteen days later.

In summarizing his results Crile groups them into three classes—positive, negative, and undetermined. Among the positive results is transfusion in acute hemorrhage; these are apparently final. In pathologic hemorrhage it has proven positive in improving the patient's immediate condition, and in most instances wholly controlled the hemorrhage itself. In shock its value seems far greater than that of any other remedy hitherto employed. From the experimental standpoint it seems to be the most effective treatment of illuminating gas poisoning.

Among the negative results are transfusion in pernicious anemia, leukemia, carcinoma, strychnine poisoning, and diphtheria toxemia.

Among the undetermined results may be mentioned chronic suppuration, its attendant debility from anemia, tuberculosis, and the acute, self-limited infectious diseases.

Of the 17 cases all were technically successful. In every instance the donee experienced a heightened vitality, and in the absence of serious organic disease the patient became buoyant, even jocose. Some had chills during transfusion or soon after, and a majority showed some febrile reaction later.

This is the first extensive clinical trial that the method of direct transfusion has received. There is no reason to suppose that it will prove a panacea for all ills. Even if its completely successful application is limited to acute hemorrhage it will prove a life-saving means of inestimable value to the surgeon. Crile states quite positively that in the treatment of shock it is the most efficient means he has yet tried, and certainly none other can speak on this topic with so great authority. Incidentally it is creditable to the altruistic spirit of Cleveland that there seems to be no difficulty in finding people perfectly willing to give of their blood to those whose need of it is greater than their own.

REPORTS ON THERAPEUTIC PROGRESS.

THE PRINCIPLE OF TOP MILKS.

In the *New York Medical Journal* of December 8, 1906, CHAPIN writes on this topic, and states that for top-milk modification, bottled milk is almost a necessity. As is well known, if milk is placed in the usual quart milk-bottles shortly after milking and kept cool, the cream will rise rapidly, and within four or five hours will all have risen, leaving only a fraction of one per cent of fat in the milk under the cream. When such instructions as to the care of the milk are given to the milk producer, the growth of bacteria in the milk will be retarded, and when the milk is delivered to the consumer not only will the cream be risen, but the milk will be in much better condition from a sanitary standpoint than if shipped in cans, which are not so easily and quickly cooled. The milk in bottles will not be opened in transit, and the danger of infection by the hands of drivers, by dust, or flies is greatly lessened. The top-milk method thus insures a fresher and safer food than when bulk milk is bought and allowed to stand for the cream to rise, which takes much longer than when fresh milk is used.

The strong point of the method from the physician's own personal standpoint is the ease with which percentages can be varied, and the mixtures made up by the nurse or mother. There are some who have not looked deeply into the subject who think that the method is inaccurate, but as a matter of fact no method approaches it in accuracy, unless standardized milk and cream are used.

The principles on which the percentage modification by the top-milk method are based are very simple, and are as follows: The fat of the milk being lighter than the serum rises to the top as cream. The proteids and sugar remain distributed throughout the milk, but are slightly less in the very rich cream of the upper layers. There are about five to seven ounces of cream on a quart of milk. If this cream is all removed along with enough of the remaining milk to make sixteen ounces, there will be two pints of milk, one containing all of the fat of a quart of milk, and the other pint being practically fat-free. It is self-evident that the percentage of fat in the pint containing all of the fat of a quart or two pints of milk will be twice that of the original quart. If this was four per cent, there would be eight per cent in the top pint. If all of the fat was in one-third of a quart of milk the percentage would be three times four per cent, or twelve per cent.

In practice all of the fat does not rise in the cream, so this mathematical ratio does not hold good, exactly. Thus, the top fifteen ounces is about twice as rich in fat as the original milk, and the top nine ounces three times as rich, instead of the top half, or sixteen ounces, or the top one-third, or ten and two-thirds ounces. This rule holds good with any milk, and has been confirmed by a great many assays. The error should not be made of thinking that the top fifteen ounces or top nine ounces will contain any definite percentage of fat regardless of the richness of the original milk, for that would be an impossibility. A quart of three-per-cent milk could furnish only sixteen ounces twice as rich, or containing six per cent fat, and a quart of five-per-cent milk sixteen ounces containing ten per cent fat. The top ten and two-thirds ounces, or one-third from the quart of three-per-cent milk, could not be richer than three times three per cent, or nine per cent, and the top ten and two-thirds ounces from the quart of five-per-cent milk could not contain over three times five, or fifteen, per cent fat. Now, milk does not run absolutely constant in fat percentage, so a margin of error must always be allowed for. But by working on a basis of four-per-cent milk the error will always be only a little above or a little

below the calculated percentage. If standardized milk was used there would be no error at all. For several years the author has been having the milk at the babies' wards of the Postgraduate Hospital assayed to determine how uniformly this rule held good, and below are the average assays:

	Whole milk. Per cent.	Top 20 ozs. Per cent.	Top 16 ozs. Per cent.	Top 9 ozs. Per cent.
1903...	4.4	6.5	8.4	13.9
1904...	4.5	..	8	12.4
1905...	4.8	6.5	8.5	13.1

These figures represent the average results obtained from 676 separate assays made during the three years mentioned. It will be seen that the percentage of fat in the top twenty ounces is almost exactly one and one-half times that of the whole milk; in the top sixteen ounces a little less than twice; and in the top nine ounces almost exactly three times that of the original milk. If four-per-cent milk had been used there would have been contained theoretically:

Whole milk. Per cent.	Top 20 ozs. Per cent.	Top 16 ozs. Per cent.	Top 9 ozs. Per cent.
4	6	8	12

When these milks are diluted to reduce the quantity of proteids the error of fat would seldom be greater than one-quarter of one per cent, which is negligible.

No such certainty can be depended upon when part of the cream is removed and mixed with milk, or when cream obtained separately from the milk is employed. Allowing that no error is made in calculating the proper quantities to use, the wide variations in the composition of creams introduce a source of error that may make the result fifty to one hundred per cent greater than was desired, and so tangle up the situation as to cast discredit upon the whole system of percentage feeding.

To recapitulate, the principles involved in the use of the top milks are: First, the use of milk bottled at the dairy as soon as possible after milking. Second, the rapid cooling of the bottled milk, which promotes separation of the cream and retards bacterial growth. Third, the taking of definite quantities from the upper portion of the quart of milk which shall include all of the cream and a portion of the under milk. If this is not done no constancy in composition can be expected. After these steps have been followed, preparation of the food consists in simply diluting and adding sugar. In addition to the accuracy of this method, the natural emulsion of the milk is not destroyed, and there is no combining of creams and milks of possibly different ages. Any desired layer of cream and milk can be easily removed by the author's cream dipper, holding just one ounce. The percentage of proteid in the whole milks or top milks will not vary much from three and one-half per cent in any milk generally obtainable. For purposes of ready calculation it is enough to consider the proteids as very nearly running equal to the butter-fat in the whole milk up to four per cent. In the top nine ounces the ratio of fats to proteids will be three to one; in the top sixteen ounces, two to one; in the top twenty ounces, one and one-half to one.

CHRONIC CONSTIPATION.

In the *St. Paul Medical Journal* for December, 1906, ALLEN deals with this question of importance to many practitioners. He says in spasmodic constipation, that form brought about by a contracted state of the small and large intestine, due to irritation of the inhibitory fibers of the splanchnic, as in hysteria and uterine disease, antispasmodics and sedatives, rather than laxatives, are indicated; for this purpose belladonna, opium, and hyoscyamus are useful remedies. Calomel and castor oil on the one hand, and the so-called drastic purgatives, such as senna, colocynth, jalap, rhamnus, and croton oil, on the other hand, should be used only (in habitual constipation) when obstinate retention of the stools must be overcome at once. In other words, they are to be given only occasionally. The same applies to the saline cathartics in maximum doses. The

salines, it is true, are frequently given in a special form under the name of bitter waters that are taken in certain spas, such as Marienbad, Carlsbad, West Baden, Kissingen, and many others; their action depends largely upon the magnesium sulphate which they contain in a large percentage. While they produce an evacuation of the bowels they act like any ordinary laxative, in that the effect is temporary and not permanent. It is possible that in a few isolated cases, in which catarrh of the intestine is the primary cause of constipation, a course of these saline waters may lead to permanent improvement by curing the catarrh. A course at any of the above named watering-places may do this. While these waters do not cure a majority of cases there is no doubt that patients suffering from habitual constipation feel comparatively well while stopping at one of these watering-places; yet it is almost certain that the old condition will return as soon as they stop taking the waters.

Rectal injections or enemas are an important method of the symptomatic treatment of constipation. The exact quantity of fluid to be injected and its composition must be determined in each individual case—that is, we must see whether cold, cool, or lukewarm water, or a mixture of water and soap-suds, vinegar, common salt, or oil, is most effective. Occasionally, especially in the spastic form, injections of olive oil alone produce excellent results, given in quantities varying from two to eight ounces. Lately glycerin has become very popular, administered as an injection in quantities of from 2 to 4 grammes with a small syringe, or inserted into the rectum in the form of suppositories. Glycerin stimulates peristalsis by withdrawing water from the intestinal wall. The tingling sensation that it produces in the rectum after administration can be overcome by the addition of an equal amount of water before being injected. The different kinds of injections all have the advantage of acting purely locally on the large intestine and of stimulating the peristalsis of that portion of the bowel without affecting the stomach, hence they are valuable in the treatment of that form of constipation characterized by fecal retention about the sigmoid and rectum. The same objection, however, is found in this method of treatment as in the case of laxatives: it sooner or later loses its power. It is advisable, therefore, in cases in which the evacuation of the bowels must be artificially stimulated for a prolonged period of time and cannot be avoided, to alternate between the different remedies and methods at our disposal.

In conclusion, laxatives should be avoided as much as possible, and when used preference should be given to aloes, cascara, and podophyllin. Drastic purgatives are to be used only occasionally, when constipation is obstinate and an immediate evacuation is necessary. The bitter waters afford only temporary relief. Sedative and antispasmodic remedies are sometimes required when constipation is of the spastic type. Injections are of certain value, but the disadvantage is that ultimately small quantities of water do not suffice, and the larger amounts must be used, which overdistend the large bowel and thereby render the use of injections valueless. Small injections of glycerin and large injections of olive oil may very properly be recommended. This would leave a great deal to be said in favor of the physical, mechanical, and dietetic treatment of chronic constipation.

In the same issue of the same journal GHENT in dealing with the dietary treatment of constipation presents the following conclusions:

A patient with habitual constipation can as a rule eat any kind of food, but those things should be selected that will leave the largest residue.

1. Vegetables, such as potatoes, especially sweet potatoes, cabbage, lettuce, onions cooked or raw, celery, beans, corn in any form, popcorn between meals, carrots, turnips, peas, radishes, beets, spinach, salads, and melons.

2. Fruits of all kinds: Berries, such as strawberries, raspberries, gooseberries, blackberries; currants, peaches, apricots, plums; apples in any form, cooked or raw,

oranges; bananas, if well borne; pears, grapes, cherries, pawpaws, and persimmons. Most of these fruits may be taken between meals, and especially before going to bed.

3. Meats: Chicken heads the list, fish, roast beef, etc. Nothing is to be taken fried. Honey, syrups, plenty of good fresh butter, eggs, milk, sugar, Graham bread and corn bread. Nuts of all kinds, if well borne by the stomach, along with plenty of highly seasoned foods.

All the breakfast foods are to be used, except oatmeal. It is very constipating.

For drinks: Coffee, not too strong, with cream and sugar; white wines, champagne, ciders, beer, lemonade, sweet milk, buttermilk, especially for babies, and cold water. Avoid tea in any form.

To be avoided are spices, peppers, condiments, olives, pickles, cheese, and lobsters.

Penzoldt's diet list is generally used because it is practical:

7 A.M. A glass of cold water.

8 A.M. A liberal breakfast, with sweetened coffee, a good deal of butter, honey and Graham bread, after which the patient should go to stool.

1 P.M. Midday meal of meat, a good deal of vegetables, salads, stewed fruits, half a bottle of light wine or cider if desired.

7 P.M. Meat, with a good deal of butter, Graham bread, stewed fruit, and beer.

10 P.M. Before retiring, fresh or stewed fruits.

TROPICAL DYSENTERY.

The *Lancet* of December 1, 1906, contains an article on this subject by BLACKHAM, in the course of which he says that in approaching the important subject of the treatment of an acute illness, such as dysentery, it is best to divide remarks under different headings indicating the therapeutical lines on which treatment is based. The indications which will assist us in the treatment of dysentery are five in number: (1) to relieve the pain and tenesmus; (2) to avoid all irritation of the inflamed mucous membrane; (3) to promote intestinal antisepsis by removing foul accumulations and arresting putrefaction; (4) to counteract any morbid agency in the blood as far as may be; and (5) to support the patient's strength by suitable diet. Let us consider these indications.

First, to relieve the pain and tenesmus. As the use of opium has been unhesitatingly condemned by the older writers in the treatment of acute dysentery, the evidence of Washbourn and Faichnie is of value as expressing the most recent views on the subject. Washbourn goes so far as to say that he has seen lives saved in South Africa by the introduction of a morphine suppository, so there is now no doubt that the first indication of the treatment of acute dysentery is to give opium in some form or other, not to act as an astringent but simply to moderate and control the painful contraction of the intestines, which produces what is known as tenesmus. Yeo suggests that the drug should be given in the form of an enema, and recommends the administration of 15 minims of the tincture in an ounce of cold mucilage of starch. It must, however, be remembered that in dysentery the anal mucous membrane is intensely irritable, and the passing of a rectal tube may be the cause of great suffering, so that rather than resort to the device of brushing the entrance to the bowel with a solution of cocaine, as has been suggested by some writers, the author invariably prefers to give a quarter or a third of a grain of morphine hypodermically. He has found this effective in relieving both tormina and tenesmus, and this appears to be the treatment to be adopted on expeditions or in camp, when suppositories and material for enemata are rarely available. Dr. Amos emphasizes the utility of opium in an article just published in the *Lancet*.

Secondly, to avoid irritation of the inflamed mucous membrane. In this relation the author points out that many years ago Sir William Gull summed up the treatment of acute dysentery in three words, viz., "Rest, warmth, and ipecacuanha." This was not only smart and epigrammatical, but it had the advantage of being correct, and Washbourn, after his exceptional experiences in South Africa, has little to add to

the aphorism of the great Gull. To avoid irritation of the inflamed mucous membrane we must apply the first two of Gull's trinity of remedies. Rest is absolutely essential, and in all cases the patient should remain in bed and use a bedpan. The frequent stools and tenesmus soon produce coldness of the surface and extremities, so to maintain the individual's vitality he must be kept warm by means of plenty of blankets and hot-water bottles if necessary, and Yeo recommends that opium liniment should be gently rubbed into the abdomen. All foods which leave a residue prone to decomposition must be avoided, and Manson objects even to milk in acute dysentery if the tongue is foul and limits the diet to weak chicken broth, barley and rice water, with a little egg-albumen, till the tongue cleans. Milk is, however, considered the best food in all cases by Scheube and Yeo, while Osler recommends "milk, whey, and broths." In the author's experience milk can be taken if the stools are watched. It should be boiled or sterilized, diluted with almost equal parts of barley water, and rendered alkaline by the addition of five grains of bicarbonate of sodium or one drachm of saccharated solution of lime in each pint. If curds appear in the stools the milk must be peptonized to limit, so far as possible, the amount of undigested milk passing through the pylorus, but if, notwithstanding this precaution, curds are still present, then it is essential that milk should be given up and the diet limited to whey, broths, and egg-albumen. In all cases clear soups flavored with the juice of fresh vegetables can be given, as they leave no residue behind and are most grateful to the patient as a change from milk. Ewart and Nash very strongly recommend this kind of broth in the treatment of typhoid fever, and we may take it that in the acute stage dysentery must be treated on much the same lines as enteric fever. Nash says that "too rigid an application of the exclusive milk diet spells disaster in many cases. The author calls to mind more than one case of typhoid fever which has been admitted to hospital most desperately ill, not so much through the disease *per se* as through loading of the intestinal tract with massive milk curds producing both harmful toxins and mechanical irritation." Stimulants should not be exhibited as a matter of routine. As Faichnie points out, they are rarely necessary, and should only be given in small quantities when the prostration of the patient is very great. A teaspoonful of brandy in a teaspoonful of hot coffee is recommended by one authority.

The third indication for treatment is to attempt to produce intestinal antisepsis. This can, of course, be merely an attempt as the bowel may be regarded as a forest crowded with flora and fauna of the most varied and septic character, but although it may be useless to try to render the intestinal mucosa aseptic it may be possible to place it in a position which will discourage the growth of a delicate organism such as the bacillus of dysentery appears to be. There are three ways in which we may attempt to treat this indication: (1) by saline aperients, which sweep all foul accumulations and organisms from the intestinal tract in a more or less mechanical manner; (2) by the administration of certain drugs said to be specific; and (3) by washing out the bowel per anum by means of astringent and antiseptic fluids. In the tropics the best preliminary treatment for all cases of diarrhea is a dose of castor oil with or without from 15 to 20 minims of laudanum and spirits of chloroform, and Manson believes that slight cases of dysentery are often checked thereby and require no further treatment except rest and a bland, non-irritating diet for a few days. Having done this the physician must elect whether he will resort to the saline, specific, or lavage method of treatment.

With regard to the saline treatment this method has many adherents amongst officers of the Royal Army Medical Corps serving in India, and in most hospitals in that country one or other of the following mixtures is well known: (1) Magnesium sulphate, one drachm; tinctura zingiberis, ten minims; acidum sulphuricum dilutum, five minims; chloroform water, to make

half an ounce. (2) Sodium sulphate, one drachm; aqua fœniculi, half an ounce. The first is Buchanan's original formula, and the latter his modification on discovering that sulphate of sodium gave, on the whole, better results than sulphate of magnesium. The mode of administration is to give a tablespoonful of one or other of these mixtures every hour until the motions become fecal, and then every three or four hours for one or two days. If the stools become watery and show any tendency to take on a feculent character the saline treatment must be promptly stopped and the ipecacuanha resorted to, and the author points out that Washbourn, from his recent experience in South Africa, regards ipecacuanha and magnesium sulphate as both specifics for the disease, but he regards ipecacuanha as the most efficient, as he has seen it cure cases in which magnesium sulphate had failed. Personally, the author always starts with the saline treatment when he can rely on the patient being efficiently nursed and the character of the stools intelligently watched, but in other cases he resorts to ipecacuanha, which he considers almost a specific for the disease.

SOME FUNDAMENTALS IN HYDROTHERAPY.

In the *Boston Medical and Surgical Journal* of November 29, 1906, NICOLA writes a paper with this title. He says that the symptom for which most patients urgently demand relief is pain, and anodynes constitute the principal weapon in the medicine case of the physician; yet every physician, no doubt, has experienced a moral qualm at being compelled to use them. While it must be admitted that anodynes are of great service to the practitioner in extreme cases, and their use could hardly be dispensed with entirely, yet it is probably true that nine-tenths of the minor aches and pains for which anodynes are promptly given could be controlled by less harmful means. Pain may be either of a congestive or neuralgic nature. When of the congestive type, cold is indicated to relieve the congestion. Cold compresses to the head, in conjunction with the hot foot or leg bath, will promptly relieve a congestive headache. Pelvic pain, due to congestion, may be relieved by the ice-bag applied to the hypogastrium in conjunction with the hot hip and leg pack. Often after laparotomy for pelvic operations when it is undesirable to use morphine, the author has seen the pain caused by the reactionary congestion of this region greatly relieved by a hot leg pack, which draws the blood away from the pelvis, accompanied by an ice-bag placed between the thighs, which by reflex contraction of the blood-vessels further tends to relieve the pelvic viscera.

Pain of a neuralgic character, on the other hand, calls for heat. Neuralgia is the cry of the nerves for blood. Heat increases the blood-supply. The best means of applying such heat locally is the very hot fomentation. The author has observed the most magic results follow this simple procedure, when properly applied. It is seldom that a pain is encountered that may not be promptly relieved by some application of heat. Deeper seated and more extensive pain, as lumbago, sciatica, etc., when not relieved by simple application of heat, may almost invariably be dispelled by the Scotch douche, consisting of a local douche of considerable force, as hot as the patient can endure, applied for two to four minutes, and followed by a cold jet for a few seconds. In private practice the hot pour may be substituted for this by placing the patient in a bath tub, and letting water fall for some distance upon the part treated. Pain in the pelvic region can, in many cases, be relieved by the hot enema, repeated if necessary. A short, very hot, sitz bath (112° to 120°) is a most excellent means of relieving chronic pelvic pain. It should be continued six to eight minutes, and instantly followed by a dash of cold water on the hips.

Constipation is a symptom which affords an excellent illustration of the utility of hydrotherapy. Already the enema is coming into general favor in preference to irritating cathartics as a means of palliating this symptom. The author has not infre-

quently seen trouble cured, moreover, by the simple expedient of injecting into the bowel a glassful of cold water on rising, to be retained until after breakfast. The stimulating effect of cold water on the peristaltic action of the colon is sufficient to produce a natural action of this organ; and in the course of one or two weeks the enema can be dispensed with, the bowel having regained its normal activity. The enema habit may also be broken off, in those accustomed to large warm enemas, by lowering the temperature of the water each day five degrees, and lessening the amount one-half pint. The peristaltic action may also be stimulated by hot and cold applications over the abdomen; also by hot and cold applications over the liver to increase the flow of bile. By massage and abdominal exercises the action of the intestines may be mechanically assisted, while the sinusoidal current is of the greatest assistance in stimulating a normal activity. By the use of these and many other physical applications which modern science affords this symptom in its most obstinate form may be radically cured without resorting to purgatives, which irritate and derange other parts of the digestive tract, and which at best tend to fasten on the patient the cathartic habit.

The last symptom which the author uses to illustrate the value of hydrotherapy is one which is only too often met in these days of increasing nervous trouble. He refers to insomnia. In this, as in all symptoms, a course of rational treatment will be directed to the cure of the fundamental condition of which this symptom is a part. But among the palliative measures he takes time to refer to but one or two of the most useful. Neutral applications have a decidedly quieting and calmative effect upon the nervous system. Where insomnia is due to nervous irritability, it is often truly gratifying to witness the transformation in the patient under the influence of a neutral bath. This bath, which may be given in any modern household, consists of a full bath at the temperature of the skin. The temperature of the water should be kept within the limits of 94° to 96°. Not infrequently the patient lapses from a state of almost intolerable restlessness into a state of repose and even quiet sleep while still in the bath. The neutral bath should always be continued for a considerable time: never less than one-half to three-quarters of an hour, and from that to an hour and a half or two hours, if necessary, in order to get the desired and lasting result. Another exceedingly sedative application is the wet-sheet pack, continued to and prolonged in the neutral stage. The author has more than once seen the victims of insomnia pass into a quiet sleep while snugly enveloped in this application. Where the symptom is a result of cerebral congestion, derivative applications, as the warm leg bath, will often produce the most happy results. The wet girdle applied to the abdomen and covered with flannel and mackintosh acts not only as a partial pack and nerve sedative, but, by dilating permanently the abdominal vessels, helps to relieve the cerebral congestion. Without referring to special cases the author can state that he has used these and other hydriatic methods with the most gratifying results in the treatment of hundreds of cases of insomnia accompanying almost every form of nervous disorders, from simple neurasthenia to cases of nervous exhaustion bordering on mania. In all these cases the hydriatic treatment is accompanied by other physiological methods, such as electricity, massage, mechanical vibrations, careful attention to diet, etc., all of which are necessary in the reconstruction of chronic invalids.

THE INTERFERING ACTION OF DRUGS IN THE CLINICAL EXAMINATION OF URINE.

The London *Lancet* of November 24, 1906, says that the difficulties attending the clinical examination of urine through the interfering action of various drugs are dealt with by M. J. Bonores in a recent number of the *Gazette Hebdomadaire des Sciences Médicales de Bordeaux*. Thus in the search for indoxyl-sulphate of potassium in the urine of a patient undergoing treatment

with iodides the addition of hydrochloric acid and chloroform in all cases gives a positive reaction, as the chloroform is tinted violet by the liberated iodine. It has been shown by Professor Denigès that the addition of a crystal of sodium hyposulphite destroys the color due to the iodine without affecting the indigotine. The determination of the xantho-uric bodies in urine is rendered inaccurate when the patient is taking theobromine, caffeine, rhubarb, or iodides. In the case of theobromine the error is due to the fact that in the presence of ammonia and a magnesium salt an insoluble compound of silver and theobromine is formed on warming. Caffeine gives a similar reaction, and the color of rhubarb interferes with the usual tests. The search for albumin is hindered when methylene blue, balsam of copaiba, tincture of myrrh, terpin hydrate, and urotropin are given as medicines. Thus, methylene blue yields a precipitate with Esbach's reagent, owing to the action of picric acid on methylene blue. In the case of balsam of copaiba it is impossible to examine urine for albumin with nitric acid, as the whole precipitate, including albumin and resin, is dissolved in the alcohol which is added to dissolve the resin alone. The oils of sandalwood and turpentine act in a similar manner. When these drugs, as well as cubebs and coal-tar, are given internally, chromic acid gives a precipitate even in the absence of albumin. But the addition of strong alcohol removes this source of error by dissolving the precipitate. After a patient has been taking tincture of myrrh for several days the urine gives on boiling a false indication of the presence of albumin, and the addition of nitric acid leads to a similar error in the case of terpin hydrate. When bromine water is added to an albuminous urine a yellowish precipitate is produced; urotropin also gives an orange-yellow precipitate with bromine water. These apparently similar results may be distinguished by warming the urine, when an albuminous precipitate forms a coagulum, whereas a urotropin precipitate is dissolved. The determination of glucose in urine by the method of polarization may be patrially or totally negatived by the presence of arbutin, peptones, quinine, benzosol, and other levogyrate substances. Such urines do not reduce Fehling's solution. When urines are colored by the administration of methylene blue the determination of the sugar present by the saccharimeter is rendered very difficult. The color should be destroyed by the addition of nitrate of mercury, or better by filtration through 5 or 6 per cent of animal charcoal.

LYSOL POISONING.

In recent times over 100 cases of lysol poisoning have taken place each year in Berlin. The poisoning has awakened considerable interest, partly because the toxicology opens up the study of a whole group of substances which are chemically related to carbolic acid. Lysol is a solution of cresol in soap; it is produced by mixing oil of tar with linseed oil or with a fat and saponifying the mixture with caustic potash and alcohol. F. Blumenthal deals with this subject in the *Deutsche medicinische Wochenschrift* of August 9, 1906. Lysol contains about 50 per cent cresol, and the latter represents a methylated phenol having the composition $C_6H_4CH_3OH$. The principal toxicological action of carbolic acid is accepted to be caustic, and the second action is that of a nerve poison. The caustic action of lysol is also seen in lysol poisoning, and Blumenthal reports a case in which extensive ulcerative destruction was seen in the esophagus, stomach, and intestines. As a rule, however, the pathological changes after poisoning with lysol are slight, as evidenced especially in experimental poisoning in dogs; here the mucous membranes generally only show some hyperemia. The amount of destructive damage is usually too slight to account for death, and one has therefore to regard lysol chiefly as a nerve and heart poison.

With regard to the lethal dose for man, the author says that the statements in the literature on the subject are not to be relied upon. One author believes that 60 grammes can be withstood, and another gives the

maximum dose as 25 grammes. The reason why these figures are of no importance is that it is not the amount which has been swallowed but the amount which has been absorbed which decides. In one case a woman drank about 50 cubic centimeters of a concentrated solution of lysol, but he was able to show that only about 7 grammes was absorbed. The patient recovered after her stomach was washed out, some two to three hours after taking the poison. In three other cases he was able to determine that from 24 to 30 grammes of lysol were absorbed. All the patients recovered in response to the washing out of the stomach. Phenol is eliminated by the kidneys as phenolsulphuric acid and glycuronic acid. Both of these substances are greatly increased in the excretion stage of lysol poisoning. Free cresol is never excreted. Glycuronic acid is derived from the albuminous bodies, and may be regarded as a protection product. It is relatively harmless. In forty-eight hours the toxic agent has been transformed into this comparatively safe substance. The symptoms pass off even more rapidly, and it may be said that if consciousness does not return in from three to twelve hours the prognosis is very bad. Blumenthal shows, on the strength of some animal experiments, that the lysol acts toxically on the cells of the organs and not on the blood, and that the protective products are formed in the liver and in the brain. He has inquired whether the glycuronic acid, which he regards as an antitoxin, is produced in excess of the lysol, and finds that this is so. The lysol enters the cell by passing into the lipoid substance; the cell then forms sulphuric acid and glycuronic acid out of its carbohydrate and albumen store in excess. The action of the lysol depends on the amount of cells attacked.

In turning to the treatment, Blumenthal places washing out the stomach first. This should be carried out within two or three hours of the swallowing, and must be continued until the washings no longer smell of lysol. He then pours in about 1¼ pints of milk. Since cresol has an affinity for fats, it is better to wash out the stomach with cream. For the heart, stimulants should be given, but neither ether nor camphor should be used. Digalen answers extremely well for this purpose. In conclusion he points out that lysol poisoning has an advantage over the majority of poisons taken for suicidal purposes; if it does not end fatally, it rarely leaves any of those terrible effects behind which one meets with after caustic or acid poisoning. —*British Medical Journal*, Dec. 1, 1906.

THE USE OF DIGITALIS IN VALVULAR DISEASE OF THE HEART.

COLBECK in the *British Medical Journal* of December 1, 1906, asserts that it seems hardly possible to resist the conclusion that the primary and essential feature in the production of dilatation and failure of the heart is a decrease, either absolute or relative, of the cardiac tonus.

The influence exerted by digitalis and its allies on the cardiovascular system may be briefly stated to be a persistent and well-marked increase in the tonic contraction of the muscular tissue of the heart and arterioles whereby (that is, on mechanical and dynamical grounds apart from neuromuscular and other considerations) the action of the central organ is rendered more deliberate and at the same time more powerful and effective. The author wishes more particularly to draw attention to the fact that digitalis increases the cardiac tonus in a very remarkable manner, and although the tonus of the systemic arterioles and capillaries is simultaneously augmented, the balance of advantage, provided the cardiac parietes remain healthy, must always be with the heart, and this is more especially the case when the organ has undergone hypertrophy.

In aortic incompetence the left ventricle has to withstand during its diastole the distending effects of the regurgitated blood-stream under the pressure of the arterial recoil. The total intraventricular pressure during diastole on a unit of surface is the resultant of the respective pressures which prevail at the aortic and mitral orifices, and is of course enormously in excess of the

normal. The magnitude of the pressure that is exerted by the arterial recoil is more readily appreciated under experimental conditions, for it has been shown in animals that if the aortic valve be suddenly rendered incompetent the aortic pressure is sufficient to produce aneurism, or even rupture of the wall of the unprepared heart.

The strain imposed on the wall of the ventricle under the conditions ordinarily connected with the incidence of aortic incompetence comes into operation gradually, and its magnitude is ultimately determined by the extent of the lesion and the state of the arterial blood-pressure, but in any event it constitutes the chief source of overwork which has to be performed by the heart. It is of course obvious that the resistance to progressive and unlimited diastolic distention of the left ventricle in aortic regurgitation must be and is provided by an increase of the tension of the muscle fibers of the ventricular wall, and this is initiated and regulated by the cardiac tonus. Did the regurgitant stream distend the ventricle "while it is relaxed and defenseless in diastole," as is so often stated, there would be little further to say about aortic incompetence. Fortunately, the heart is enabled to fall back on a second line of defense—to wit, the cardiac tonus, which, assuming valvular functions, staves off unlimited dilatation and maintains more or less adequately the systemic blood-pressure. Dilatation would quickly get the upper hand of hypertrophy at the outset were it not that the ventricle falls back on its reserve power, which temporarily wards off the distending effect of the lesion. This increased display of functional activity leads, under favorable nutritional conditions, to hypertrophy, which restores and maintains the tonus of the ventricular wall up to the level of the requirements that are demanded by the increase of intraventricular pressure. There is no doubt a further cause for hypertrophy in that the ventricle has to propel a greater quantity of blood at each systole; but this factor must be unimportant compared with the task of maintaining the tonus of the cardiac wall.

From a theoretical standpoint the action of digitalis would appear at first sight to afford promise of considerable assistance in the treatment of aortic insufficiency, but a very little consideration is sufficient to banish this expectation.

In uncomplicated aortic incompetence, under the most favorable conditions of establishing compensation, the left ventricle is working in the face of diminished reserve power, and, consequently, of a lessened margin of safety. The exhibition of digitalis would no doubt augment the tonus of the ventricular wall, but concurrently the tonus of the peripheral vessels is heightened and the length of the diastole increased. Provided the cardiac parietes were sound, and so long as the conditions of the circulation were fairly equable, the balance of advantage would doubtless rest with the heart, but the introduction of any further strain, in the shape of nervous or physical exertion and so forth, might seriously imperil or even overcome the integrity and resistance of the ventricular walls. The concomitant pressure of mitral incompetence would sensibly diminish the risk of a cardiac breakdown, by enabling the distressed ventricle to discharge part at least of its contents along the path of lesser resistance provided by the imperfectly closed auriculoventricular opening. The administration of digitalis is absolutely contraindicated by the presence of degeneration or disease of the ventricular wall.

On the other hand, it is readily conceivable that in the course of aortic incompetence a comparatively sound ventricular wall may be temporarily overpowered by exposure to inordinate extraneous strain, such as may be entailed, for instance, by undue physical exertion, intercurrent disease, and so forth; under circumstances of this kind digitalis should be invaluable for the purpose of restoring the vigor of the heart. The simultaneous action of the drug on the right side of the heart is not without influence in the restoration of compensation; but the consideration of the operation of this factor, which is not altogether favorable in aortic disease, will be

discussed by the author at another time under the head of mitral incompetence.

In practice, then, it may be inferred that digitalis should seldom, if ever, be given in cases of aortic regurgitation which have developed during or after middle life, since the ventricular wall is seldom perfectly sound under these circumstances, and never in cases which give evidence of myocardial degeneration or disease. If complete rest is obtained, digitalis is permissible and beneficial up to a certain point in young, otherwise healthy adults showing signs of circulatory failure, more especially when the aortic lesion is combined with mitral incompetence. The drug should be discontinued for some time before exercise is resumed, and for reasons which the author has already advanced this rule should be rigidly observed. Neglect of this precaution might be followed by rapid failure of the ventricle and sudden death.

MALARIAL HEMOGLOBINURIA.

In concluding quite an exhaustive article on this subject in the *Journal of the American Medical Association* of December 15, 1906, BREM states that the treatment he pursued can be summed up practically in one word—quinine. In every case the drug was administered by intramuscular injections, and in every case, including the fatal ones, hemoglobinuria or blackwater disappeared with greater or less rapidity, and recurred only in the cases that received the smaller quantities. Albuminuria also rapidly decreased. Morphine was used freely with quinine to allay restlessness and vomiting and to lessen cinchonization.

Two methods of treatment were used. The first five patients were given 10 or 15 grains of quinine intramuscularly every four or six hours for varying lengths of time, usually covering forty-eight hours, and then 5 grains by mouth every four hours, except in one case. The next eight patients received 10 grains intramuscularly at 8 and 10 A.M. daily as long as indicated by vomiting or by the general condition of the patient, and then 30 grains by mouth given in broken doses before 12, noon, daily. The last patient received 20 grains intramuscularly on the evening hemoglobinuria developed, 20 grains intramuscularly the following morning and again in the afternoon, and 30 grains intramuscularly the third morning. The number of cases is too small to allow conclusions to be drawn from the mortality. There was one death in each group of cases. Theoretically, if quinine as an etiologic factor has been excluded, the first method should be of greater value. The cases in which recovery took place under it (except one case) ran a milder course and appeared to lose less hemoglobin than those treated by the second method. In none of this group did hemoglobinuria or blackwater recur after its first disappearance. In the second group hemoglobinuria recurred in four cases, in two of which there were three recurrences. Further, a case of algid pernicious malaria was admitted to the ward at 9 A.M. A moderate number of estivo-autumnal parasites were present in the peripheral blood. He received 10 grains of quinine intramuscularly at 10 A.M. and 12 noon, and the same dose at 8 and 10 A.M. on the following day. On the morning of the third day the author was able still to find parasites in the peripheral blood. If hemoglobinuria is caused by the estivo-autumnal parasite, it seems certain that the small doses are not sufficient to destroy the organisms in a minimum length of time, every hour of which counts in the saving of so much blood for the patient.

The author believes that the best results will be obtained by administering 10 grains of quinine intramuscularly every four hours during the first forty-eight hours, or 15 grains may be well substituted for the first three or four injections. By this means a strong solution of quinine in the blood can be maintained during the cycle of development of the estivo-autumnal parasite, and all parasites will be subjected to its influence at some time during the cycle when they are most susceptible to the action of quinine. After forty-eight hours the dose

may be reduced and given by mouth if vomiting does not forbid.

Two different preparations of quinine were used for intramuscular injections, the bihydrochloride and the bimuriate with urea. Extensive necrosis and suppuration in two cases followed the use of the former preparation, while only a few superficial necroses occurred after the latter. In eight of the cases the two preparations were alternated, and with one exception the bihydrochloride proved less irritating. The solution of bihydrochloride used in the two cases of extensive necrosis did not contain an excess of hydrochloric acid, and there was a precipitate in the bottle. The addition of a small amount of sodium bicarbonate to a portion of the solution caused a heavy precipitation. It is probable, then, that the alkalinity of the tissues caused a partial precipitation of quinine at the sites of the injections and that necrosis of the tissues and infection followed. Later solutions containing an excess of acid were used, and the results from these solutions have been definitely superior to the results from solutions of the bimuriate and urea. The strength of the latter solutions was 1 to 12; the strength of the solutions of bihydrochloride from which the best results were obtained was 1 to 3. The bihydrochloride has the additional advantage of being much more easily administered.

THE BLOODLESS METHODS OF ARTIFICIAL DILATATION OF THE CERVIX UTERI AT FULL TERM.

Lewis (*Surgery, Gynecology, and Obstetrics,* December, 1906) states that in looking over the literature of the last few years he concludes that the advocates of the branching metallic dilators, especially the Bossi type, have not made out a case. All the branching instruments are complicated and composed of a very large number of parts. All are dangerous as carriers of infection, because all are difficult to clean. Most of them depend for the dilating force upon a screw at the end of the instrument—usually eight or ten inches distant from the dilating tissues. Various rules are promulgated by various authorities about taking so and so many turns of the screw in so and so many minutes, waiting so and so long before screwing up again, and otherwise doing things by rote. The great fault of all is that the intelligence of the operator has to pass through so much mechanism before it reaches the tissues. It is impossible, at the end of a complicated instrument worked by a finely threaded screw, to have any adequate idea of how much force is being exercised upon the tissues of the os and cervix. Many authors state that the os must be tense, others that it must be loose. In reality, that excessively rigid os about which we hear so much and see so little is extremely rare. When it does exist, there is no method of the bloodless variety which can dilate it without great danger of serious lacerations. Here is the place for one of the bloody measures. The consistent and careful use of the bags, or, if more haste is demanded, the bimanual method, will overcome the other cases about as quickly as the Bossi method, and always more safely.

Bardeleben's examinations prove that far more lesions follow the method of Bossi than follow labors where that method is not employed. The large and growing number of authorities, especially in Germany, who are coming out from the glamor of Leopold's enthusiasm, and who are reporting failures with the Bossi method and serious lacerations following it, are continually furnishing more and more evidence against it.

PUERPERAL INFECTION—USE OF COLLARGOL INJECTIONS.

The results obtained by Bonnaire (*Presse Médicale,* No. 93, 1906) were very favorable, although as the method was only used in the most severe cases the mortality was high.

The substance has been used by the mouth, the rectum, hypodermically, and intravenously. The last is the most effective

and was used by the author. The hypodermic method is to be avoided on account of the pain and the tendency to abscess. By the mouth it is perhaps ineffective. It may be used in chronic cases by means of inunctions (as unguentum Credé). It is also useful locally in various infections—*e.g.*, purulent ophthalmia, and as one-per-cent solution as a douche in vaginitis. The best method of using it in puerperal infection is by injection in the veins near the elbow, the needle being inserted directly into the vein without its being exposed by incision. Sterilization of the solution is unnecessary, as it is strongly antiseptic, 1/4500 killing streptococci. The average intravenous dose is 10 cubic centimeters of a one-per-cent solution. It is necessary to be careful not to inject air as the solution froths easily. Strong solutions are of no advantage. After the injection there is some fever, rarely high, which may be preceded by a chill, and is followed by a sense of well-being. The chill is important, being absent in those cases which are likely to end fatally, and strongly marked in favorable cases unless a chill has occurred just before the injection. The chill only follows the first injection; the fever occurs after each. The results obtained were good. There is no tendency to cause argyria, although excretion is slow and mainly through the bowel.

MOVABLE KIDNEY—RESULTS OF NEPHROPEXY.

The disputed point whether nervous symptoms occurring in persons with movable kidney are likely to be relieved by nephropexy is considered by DOERING (*Deutsche Zeitschrift für Chirurgie,* lxxxiv, 1906).

The methods of attaching the kidney to the abdominal wall are numerous, but all may be divided into three groups: (1) Those in which the capsule is split and sewed to the abdominal muscles; (2) those in which the capsule is sewed to the diaphragm; and (3) those in which silver wire is passed through the lower end of the kidney and around the lowest rib. The last method is supposed to allow the organ to make its normal excursion with the diaphragm. All authors, with the exception of Küster and a few others who use the last method, report that although the attacks of renal colic are permanently relieved by the operation there is little effect on the nervous symptoms. Küster, however, claims to relieve a large proportion of these cases also. Doering, who uses the first method, finds that the kidney is kept permanently in place after the operation, but in spite of this there is little effect on the nervous symptoms, and as his figures agree with those of all authors excepting Küster, he assumes that Küster is too sanguine in estimating his cured cases. The difference in result cannot be due to difference in technique, as the kidneys operated on by Doering show no tendency to again become movable.

MYOSITIS OSSIFICANS CURED BY THIOSINAMINE.

Having obtained good results from thiosinamine in apparently hopeless cases of keloid, scars from burns and *x*-rays, and in urethral strictures, BOSECK (*Münchener medicinische Wochenschrift,* No. 48, 1906) tried it in a case of myositis ossificans with good results.

The patient showed no symptoms except loss of power in the muscles of the right shoulder and left side of the neck, and loud cracking noises on moving the parts. In the right sternomastoid a bony mass was felt. Injections of 1½ grains were given daily for a month, by which time the symptoms had entirely subsided.

CHLOROFORM-OXYGEN ANESTHESIA AND PNEUMONIA.

In a series of experiments on rabbits LICHTENBERG (*Münchener medicinische Wochenschrift,* No. 47, 1906) found that inhalation of chloroform could of itself cause pneumonia. The amounts administered were so large that the results can hardly be applied to ordinary surgical anesthesia.

A very important point, however, was

discovered, namely, that administration of oxygen with the chloroform led to shallow respiration on account of the saturation of the blood with oxygen, and this in turn led to disuse of part of the lung, with a tendency to stagnation of air saturated with the anesthetic, and thus to a prolonged action of the poison on certain parts of the lung, the resistance of which was further lessened by poor blood supply following reduced activity. Lichtenberg therefore advises against the use of oxygen as a carrier for the chloroform, believing that pneumonia is more frequent with it than with air.

PUERPERAL ECLAMPSIA—TREATMENT WITH PARATHYROID EXTRACT.

Having found that the parathyroid glands were abnormally small in several women who died from eclampsia, VASSALE (*Münchener medicinische Wochenschrift,* No. 48, 1906) removed the parathyroids of mice and cats and found that typical convulsions occurred. The same phenomena were seen in dogs, and were relieved by the internal administration of parathyroid gland, without which all died. Albuminuria and occasionally anuria accompanied the convulsions. A condition resembling puerperal eclampsia was produced by ligation of the ureters after removal of the parathyroids. Vassale believes that eclampsia is due to insufficiency of the parathyroids associated with interference with the renal function through pressure of the gravid uterus on the ureters.

EXTENSIVE LUMBAR ANESTHESIA.

It is possible, according to DONITZ (*Münchener medicinische Wochenschrift,* No. 48, 1906), to extend the anesthesia to the upper part of the chest and even to the arms without danger if tropacocaine is used instead of novocaine or stovaine, which have more effect on the motor roots and thus are likely to cause paralysis of respiration if pushed too high. Tropacocaine has almost no paralytic effect on the motor roots.

The extension upward of the anesthetic effect is due to the flowing upward of the liquid in which the anesthetic is dissolved, and this occurs by flowing of the cerebrospinal fluid and not by diffusion. If therefore we wish to extend the effect upward we cause this fluid to flow upward after making the injection. There are three ways of doing this: (1) By changing the position of the body so that the head is lower. The injection being made in the sitting position, the horizontal or the elevated pelvis position is then assumed, and the fluid flows upward by gravity. (2) By lessening blood-pressure in the brain, thus lessening meningeal pressure and drawing fluid from the cord. This may be done by putting a bandage around the neck a few minutes before giving the injection and removing it after. The opposite action is sometimes seen when persons with heart disease are put in the elevated pelvis position. There is congestion of the brain and a flow of fluid downward, which reverses the usual effect of elevating the pelvis. Deep respiration also causes a lessening of blood-pressure in the brain and draws fluid upward in the canal. (3) Increase in the amount of fluid injected.

Vomiting also causes anemia of the brain and an extension upward of the effect. Vomiting is not due to any local action, but to general effect from absorption, and bears relation to the amount of anesthetic used rather than to the extent of the anesthesia. The effect is more pronounced and more lasting in old persons, and they are therefore not adapted to high anesthesia; children, on the contrary, are more prone to symptoms of general intoxication from absorption. The usual dose is 5 centigrammes dissolved in 1 cubic centimeter of water. This solution is isotonic. If this is injected undiluted in the horizontal position there is anesthesia of the perineum only; if in the sitting position with change to horizontal the legs are also affected; if the pelvis is elevated there is enough anesthesia for herniotomy. If the syringe is drawn out and filled with 10 cubic centimeters of cerebrospinal fluid, thus diluting the anesthetic before injecting it, the effects under previous conditions reach to the groin, the

umbilicus, and the arms respectively. When the effect reaches the chin the pelvis must be lowered. The neck-band and the deep respiration extend these effects slightly. For anesthesia of the upper part of the body and for labor cases tropacocaine is preferable as it has almost no effect on the motor sphere. This effect makes stovaine better for the reduction of fractures and dislocations and for orthopedic operations.

BIER'S CONGESTION TREATMENT.

The benefit from this method of treatment is shown by HOMBERGER (*Archiv für klinische Chirurgie,* lxxx, 4) to be due to the increased flow of blood through the dilated veins and not to stasis.

It has been shown experimentally that the temperature of any part of the body as compared to another part is in direct relation to the amount of blood passing through it in a given time. The rise in temperature which accompanies Bier's congestion thus shows that circulation is accelerated, whereas in inflammation it is ordinarily slowed. The slowing can be shown by venesection to exist only in the very center of the inflamed area; the flow is more rapid in the neighboring parts. If there were stasis the temperature of the part would fall. The increased temperature increases combustion—that is, destruction of waste matter—and thus is of benefit. All methods which stimulate the local circulation—*e.g.,* heat and cold—have a similar beneficial effect.

NEVI AND ANGIOMATA—ELECTRIC TREATMENT.

Electropuncture is considered by ZIMMERN (*Journal de Médecine,* No. 52, 1906) the best treatment of superficial angiomata and nevi. He uses a high-frequency current and fine needles which must be insulated except near the point, as action on the skin itself will cause scarring. In cavernous angioma with dilated vessels the current is carried along these and the method of application is evident, but in flat, uniform nevi the application is more difficult. In most cases he begins at the edge of the spot, inserting one needle slanting away from the center of the nevus, and the other also at the edge and slanting parallel to it at a distance of one-fifth to one-half inch. The current is turned on for about a minute, and then one of the needles is moved to the other side of its fellow and inserted in the same way. This is continued until the entire mass is circumscribed, five to six applications being made at each séance. When the circumference has been treated the center is attacked. Four or five needles are connected with the positive pole and inserted at equal distances around the edge of the mass, and one needle connected with the negative pole is placed in the center. The current is then turned on and continued until a grayish discoloration is noticed around the needles, generally at the negative pole first. This is the sign for immediate cessation of the séance. The strength of the current should not be more than 60 milliamperes nor less than 20, 40 to 50 being the best. The pain may be considerable, but anesthesia is rarely required. Pain may ordinarily be prevented by turning the current up to 60 instantly and reducing it rapidly to the desired strength. The treatment is indicated in all superficial angiomata and nevi.

ANESTHESIA—PREVENTION OF VOMITING.

After a number of vain attempts to find a means of preventing the nausea and vomiting which so often follow the use of ether and chloroform, WANIETSCHECK (*Prager medicinischer Wochenschrift,* No. 50, 1906) discovered that the internal use of alypin, one of the newer local anesthetics, would entirely prevent it.

Just before beginning the administration of the anesthetic the patient is given 5 to 6 drops of a five-per-cent solution, and this dose is repeated as soon as the patient is sufficiently recovered to swallow. This usually prevents all nausea, but if there is a tendency to it the dose may be again repeated in one or two hours.

BRAIN INJURY—INDICATIONS FOR LATE OPERATION.

The indications for operative treatment of cases with brain injuries of long standing are considered in detail by TIXIER (*Revue de Chirurgie,* Nos. 10 and 11, 1906). In most cases of head injury with lesion of the brain there is necessity for immediate operation, but in some cases the signs of brain trouble do not show themselves until several months or even years after the injury. In this class of cases it is very difficult to decide how much benefit is to be expected from an operation.

As regards the history, the cases fall into three groups: (1) No sign of brain trouble at the time of injury; (2) temporary recovery from symptoms; (3) constant trouble, steadily increasing in severity and finally justifying operation, which is only indicated if the phenomena are severe enough to prevent earning a livelihood.

A symptom demanding operation is headache. This is ordinarily localized at the point of injury and made worse by pressure over this point. When it is the only symptom it rarely demands trephining. The usual line of treatment should first be tried, followed by lumbar puncture, and if this gives no relief, by incision of the scalp; free any adhesions to the periosteum of the skull and relieve pressure of scar tissue on cutaneous nerves. If the pain continues to be so severe as to prevent mental work, the skull may be opened. No one lesion of the meninges or brain has a particular tendency to cause local pain, but osteitis of the skull is the most frequent cause. The dura may be found thickened or pinched or merely adherent.

In cases of Jacksonian epilepsy or localized aura corresponding in location to a scar or sign of injury on the head, operation is clearly indicated.

In cases with Jacksonian epilepsy with no scar on the head, the localization may be more difficult, but the most puzzling cases are those in which the localizing symptoms point to a part of the brain other than that which shows the scar. In such cases it is ordinarily best to be directed by the symptoms rather than by the signs of external injury, as the lesion of the brain is often far away from the point of injury. If there are no localizing signs it is necessary to study the previous history of the patient for signs of a neuropathic tendency existing before the traumatism. If there is no such history and no nervousness between fits there is a good prospect of operation giving relief. It is claimed that nitrite of amyl inhaled will cause a fit in traumatic epilepsy and prevent one in idiopathic, but this is not absolutely true. The causation of a fit by vasodilators is, however, strong evidence of the attacks depending on a local lesion. In some cases relief of pressure by lumbar puncture will stop the spells, and this should be tried before any operation on the skull. Intellectual troubles which can be brought into positive relation to the injury are no bar to operation and are likely to be improved by trephining.

Great care must be exercised to distinguish between true traumatic lesions and traumatic hysteria. The latter shows a tendency to be worse on certain days, and if there is a contracture this will show the same peculiarity. The paralysis in hysteric cases is less definitely limited to one side and the reflexes are less affected. Localized paralysis points very strongly to a lesion of the motor cortex of the opposite side.

The characteristic change in lesions of the cortex is loss of stereognostic sense—that is, loss of the power to name an object held in the hand but not seen. There is no pain or thermal sense as a rule.

Loss of visual power in the same half of each eye, true hemianopsia, is ordinarily indicative of lesion in the occipital lobe. In some cases there is loss of color sense on one side, and this should be looked for if perception seems normal. Other changes of special senses are of less importance.

Pure motor aphasia is positive evidence of lesion of the island of Broca or lower part of the motor region.

When careful study of the symptoms indicates a lesion of a certain part of the brain, the skull should be opened. This is

best done by turning back a large flap of scalp and periosteum and boring small trephine holes at the corners of the proposed skull flap and connecting these with a wire saw.

If lesions sufficiently pronounced to cause symptoms are not found outside the dura this membrane should be opened by a large crucial incision. If any part of the cortex is diseased it may be removed without danger, but if it seems normal it is not justifiable to excise the part in which the trouble seems to lie. The operation being completed the dura mater should not be closed, as this is likely to lead to pressure from extravasated blood. A small opening should be left in the skull, and through this the dura and periosteum should be sewed together. This will prevent pressure symptoms following the operation. If the operation is not permanently successful a second and third may be performed, as there is no danger from the trephining if properly performed.

THYMUS STENOSIS AND DEATH DUE TO PRESSURE OF THE THYMUS GLAND.

A large hyperplastic gland in many cases is capable of exerting pressure upon the organs lying in the mediastinal space. This pressure is exerted in most cases upon the air-passages, less frequently upon the heart and large vessels. This condition of pressure has often been disputed, and in a careful and thorough work of FRIEDLEBEN it is asserted that "there is no pressure on the part of the thymus gland either upon the air-passages, vessels, or nerves." This was so generally accepted that in vain Virchow and Cohnheim demonstrated that pressure due to the thymus gland had sometimes resulted in death.

The tracheobronchial stenosis due to pressure by a hyperplastic thymus is a clinical and pathologically proven affection not to be confounded with spasm of the glottis. It occurs oftener than commonly supposed. The objective symptoms differ according to the degree of stenosis. There are transitions from an apparently harmless stridor of infants to a case of dangerous dyspnea with slow, suffocating death, or sudden death due to a total compression of the air-passages. The stenosis may make its appearance slowly or suddenly. It may recover spontaneously, or without warning become fatal. Even in the apparently harmless cases in which the patient seems to suffer no discomfort the prognosis must be very guarded, because a sudden, unexpected change in the disease may make conditions grave. The indication for immediate operation is when suffocating attacks occur. Time and experience will tell whether or not to operate prophylactically. An operation is directed to removing the obstruction.

If an ectopexia is not sufficient, the capsule should be incised and the gland removed, either partially or completely. An extra-capsular excision is anatomically not possible. The operations that have been performed so far have not only been associated with good results, but have been relatively simple and without danger. Anesthesia is neither necessary nor advisable. —*Archiv für klinische Chirurgie,* 1906; quoted from the *St. Paul Medical Journal,* January, 1907.

HIP-JOINT AMPUTATION.

CATES (*Surgery, Gynecology, and Obstetrics,* January, 1907) on the basis of five cases considers the safest and easiest method that by dissection, since it offers the best means of controlling the hemorrhage and the quickest method of effecting disarticulation. A circular incision is made through the skin six inches below the joint, and is extended up the outer side of the thigh over the great trochanter. The skin flap is dissected back to the point where the muscles are to be divided. The common femoral artery and femoral vein are separately ligated with two ligatures, and the vessels divided between them. This having been accomplished the knife is carried by a circular sweep down to the bone. The neck of the latter is cleared, and while an assistant alternately makes internal and external rotation the muscles attached to the

trochanters are divided. The capsule is opened in front, and the assistant pries the head out of the acetabulum while the operator carries the knife down behind the bone, completely dividing the capsule. A large counter-opening is made in the posterior flap through which a gauze or cigarette drain is carried, also one from each angle of the wound down to the acetabulum. The muscles are brought together by deep catgut sutures.

The cases reported by Cates were some of them such as afforded the most unfavorable prognosis. The first was a far-advanced tuberculous case, which lived seven months after operation. The second was one of lymphosarcoma. This operation was performed by the help of Wyeth's pins. The one on the outside of the thigh broke, resulting in a violent hemorrhage. The patient recovered from the operation, but died three months later from recurrence on the left side of the chest. The third was an instance of compound fracture complicated by rapidly spreading gangrene. At the time of operation necrosis had affected all the soft tissues of the entire limb, even extending up the hip and involving part of the abdomen. The day following operation the stump showed signs of necrosis, and was thereafter treated according to the open method. The patient recovered completely. The fourth patient was suffering from what seemed to have been an extension of tuberculosis of the femur with multiple sinuses. The amputation wound became infected and was treated by the open method. This patient recovered. The fifth case was an instance of tuberculous hip-joint with multiple sinuses and necrosing inguinal glands. The external iliac artery and vein were tied above Poupart's ligament, on account of the mass of necrotic tissue in Scarpa's triangle. Not only was the head of the femur eaten away, but the entire iliac bone, nearly to the crest of the ilium, was worm-eaten and rotten. The patient collapsed, was revived by hot saline solution in his veins, and lived for four days after operation.

REVIEWS.

GREEN'S ENCYCLOPEDIA AND DICTIONARY OF MEDICINE AND SURGERY. Volumes I, II, and III. From AAC to GUM. William Green & Company, Edinburgh and London, 1906.

This work, which as is seen from the alphabetical arrangement is just about half completed, is designed to be to medicine what the Encyclopedia Brittanica or any other well-known encyclopedia is to ordinary learning. The authors who have contributed to it are all of them recognized as occupying authoritative positions in England, and their contributions are in the great majority of instances excellent and reliable. The illustrations are very much better than are usually found in books of this character, both those in colors and those in black and white plates being unusually well executed. Each volume contains a little over five hundred pages, and is bound in a durable cover. We note with interest that the author of the article on Diphtheria states that 1500 units of antitoxin are sufficient if the disease is treated on the first day, and that it will usually be unnecessary to give more than 2000 under these circumstances, whereas if the treatment is not instituted on the first day the amount must be increased up to 8000 or 10,000 units, and he himself has not rarely administered from 30,000 to 50,000 units, although he states that 16,000 units is about the limit for use in the first twenty-four hours.

THE INTERNATIONAL MEDICAL ANNUAL. A Yearbook of Treatment. E. B. Treat & Company, New York, 1907.

This Medical Annual, which has now reached its twenty-fifth year, has come to be recognized by the medical profession in England and America as affording a val-

uable summary of much of the literature of medicine during the year. It is not possible in the small amount of space which exists between its covers to give exhaustive consideration to the numerous important papers which have appeared—only a brief résumé of most of them is to be found. The first part consists in a brief therapeutic summary by Charteris, which covers a little over forty pages. This is followed by an article by Dr. Emanuel upon Opsonins, and again by one upon Electro-Therapeutics and Radio-Therapeutics by Dr. Morton, of London. Then follows a general consideration of medical literature as we have described it, including all branches of medicine and surgery. Scattered through the volume are a number of excellent colored plates, of which the best are those of Molluscum Contagiosum and one showing Lichen Planus. In the article on Plague a good deal of space is devoted to the importance of the rat, and the fleas which it bears, in the dissemination of the bacillus of this disease. The black and white illustrations, some of which are in the form of plates, are unusually good. A very interesting colored plate is that showing the Spirochæta Pallida stained by Levaditi's method. Altogether the Medical Annual for 1907 certainly upholds the reputation of the earlier volumes.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by H. R. M. Landis, M.D. Volume I, 1907. Price, in paper binding, $6.00 for the four issues.

This, the March issue, the first volume of Progressive Medicine for 1907, deals with a number of important departments in medical science. A large number of pages are devoted to the surgery of the head, neck, and thorax, by Dr. Charles H. Frazier. His article is one which should be in the hands of every active practitioner of surgery, and many of the papers and results quoted have an important bearing upon the methods of procedure which should be resorted to in the presence of traumatism and disease. Dr. Robert B. Preble in his article upon Infectious Diseases, including acute rheumatism and croupous pneumonia, points out, amongst other important matters, the necessity of carrying on the campaign against the house-fly, the bedbug, and the flea, as well as the mosquito, if we are to prevent the spread of disease. In Dr. Crandall's article upon Diseases of Children he points out that one of the most important factors in the morbidity and mortality of childhood is the ignorance of young mothers in regard to their duties in the rearing of children, and this ignorance is often found most marked in those who are most skilled in arts, letters, and science. Dr. Kyle writes upon the subject of Laryngology and Rhinology, both with reference to local applications and surgical operations, and Dr. B. Alexander Randall, Professor of Otology in the University of Pennsylvania, discusses the advances made in otology during the past year.

PRINCIPLES AND APPLICATION OF LOCAL TREATMENT OF DISEASES OF THE SKIN. By L. Duncan Bulkley, A.M., M.D. The Rebman Company, New York, 1907. Price $1.00.

This small octavo volume of less than 150 pages does not pretend to be a complete treatise on local treatment of diseases of the skin. It is, on the other hand, a condensation of four lectures given to practicing physicians in the New York Skin and Cancer Hospital in the spring of 1906. The book contains a number of prescriptions indicating the methods employed by Dr. Bulkley in his treatment of various dermatological states.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Original Articles. Edited by A. O. J. Kelly, A.M., M.D. Volume IV, 16th Series, 1906.

In the pages which are devoted to treatment in this issue of the International Clinics we find an article by Dr. Rhein upon Electro-Therapeutics, one upon the Prevention and Treatment of Chronic Nephritis by Dr. French, another upon

Constipation by St. Steele; a fourth upon Obesity by Dr. Grocco; and last of all one upon the Non-operative Treatment of Renal and Urethral Calculi causing Colic by Lilienthal. These four articles take up 70 pages. The remaining 220 pages in the book deal with various subjects in medicine, surgery, obstetrics, gynecology, laryngology, and otology, the article upon otology being by Dr. Richardson upon "Mastoid Operations," while that on laryngology is upon the "Laryngological Complications of Pulmonary Tuberculosis" by Dr. Trevelyan, of London.

THE TOXINS AND VENOMS, AND THEIR ANTIBODIES. By E. Pozzi Escot. Translated by Alfred I. Cohn. John Wiley & Sons, New York, 1906. Price $1.00.

The object of this little book is to describe the various forms of toxins and the physiological and pathological effects which they exercise upon the animal body. The first chapter deals with alkaloidal toxins, ptomaines and leucomaines, the second with toxins and antitoxins, the third with vegetable and animal toxins, the fourth with microbial toxins, and the fifth with venoms. A large number of references to modern literature of this subject are found at the bottom of almost every page. As the book only contains 101 pages it is not of course an exhaustive consideration of this comparatively new but now very large topic.

PHYSICAL CHEMISTRY IN THE SERVICE OF MEDICINE. Being Seven Addresses Delivered by Dr. Wolfgang Pauli. Translated by Dr. Martin H. Fischer. John Wiley & Sons, New York, 1907. Price $1.25.

These addresses were delivered as summaries of Pauli's special investigations concerning the application of physical chemistry to different fields in medicine as rendered possible through advances in the physics and chemistry of organic colloids. The chapters of the book are as follows: On Physico-chemical Methods and Problems in Medicine, the General Physical Chemistry of the Cells and Tissues, the Colloidal States and the Reactions that go on in Living Matter, Studies on Ions, or the Relation of Physico-chemical Properties and Medicinal Effects, Changes Wrought in Pathology through Advances in Physical Chemistry, and lastly on the Electrical Charge of Protein and its Significance.

PATHOLOGY, GENERAL AND SPECIAL. A Manual for Students and Practitioners. By John Stenhouse, M.A., B.Sc., and John Ferguson, M.A., M.D. Lea Brothers & Co., Philadelphia, 1907. Price $1.00.

This is another one of the Epitome Series Quiz-Compends, covering in the neighborhood of 275 pages, prepared as a condensation of pathological facts for the use of students. As a quiz-compend it can be recommended, but like all other books of its class it is too brief to be a book from which a student may adequately study this department of medical science.

REPORT OF THE SURGEON-GENERAL OF THE ARMY FOR THE SECRETARY OF WAR. For the Fiscal Year Ending June 30, 1906. Government Printing Office, Washington.

To those who are interested in military medicine, and indeed in medicine in general, the report of Surgeon-General O'Reilly for the past fiscal year will be of great interest. The difference in the morbidity and mortality rates of the white, colored, and Filipino troops is noteworthy, and the sanitary reports which are made as to the condition of the various posts in this country and in the island possessions are also of value to sanitarians and medical men.

DISEASES OF THE NOSE AND THROAT. By J. Bruce Ferguson, M.D. Lea Brothers & Company, Philadelphia and New York, 1907. Price $1.00.

This little book belongs to Lea's Medical Epitome Series and is designed to present in concise and practical form the diagnosis and treatment of the diseases of the nose and throat, which it does as well as is possible for a duodecimo volume of less

than 250 pages to accomplish. The chapters are some of them followed by a series of questions designed to permit the student to quiz himself upon what he has gone over. We have no doubt that it will aid students to obtain a superficial knowledge of diagnosis and therapeutic procedure, but like most condensed manuals it cannot take the place, except in a very superficial way, of the ordinary text-books upon this subject.

PARAFFIN IN SURGERY. A Critical and Clinical Study. By William H. Luckett, B.S., M.D., and Frank I. Horn, M.D. Illustrated. Surgery Publishing Co., New York, 1907.

This book, dedicated to Dr. Arpad P. Gerster, printed in clear, large type upon paper of high grade and admirably illustrated, gives to the surgeon a detailed knowledge of a method of treatment which he is likely to have regarded with skepticism as to its after-effects because all the reported cases were apparently successful, and the great majority of them appeared in print so shortly after the injection as to suggest that even the operator had some doubt as to his final results. The hundred-odd pages can be covered in an hour's time. The indications for the use of the paraffin injections are both functional and cosmetic. Under the first heading are included intervention in cases of paralysis of the soft palate, of insufficiency of the anal and vesical sphincters, of hernia, of prolapsus uteri, of ankylosis after resection, of varicose veins, etc. Under the second heading are included injections after removal of testicles or mammæ, for the correction of depressed disfiguring cicatrices, for filling up bone scars such as occur after operation for osteomyelitis, perhaps for filling brain defects, and finally injections in cases of saddle-nose deformity, or that resulting from fracture or loss of septum by disease.

After an interesting discussion as to the ultimate disposition of the paraffin, the author holds that its final arrangement—*i.e.*, the permanence of the prosthesis—depends upon the reliability of its anchorage. The softer the paraffin the more likely is it to be absorbed or disappear altogether by oxidation, by phagocytosis, or by some biochemical process not quite understood.

The harder the paraffin the richer in coal elements; hence the more irritating and less absorbable. The harder the paraffin the less the biochemical action, the more stable and lasting the deposit. The harder the paraffin the more rapidly will it cool and solidify in the tissues, thus helping to anchor itself, resisting the action of muscular contractions and outside manipulation, while the capsule is being formed.

The technique and the armamentarium are taken up in detail. Causes of failures and the accidents are taken up. Cases are reported with photographic illustrations of results. The book finally closes with a bibliography.

SURGERY OF GENITO-URINARY ORGANS. By J. W. S. Gouley, M.D. Rebman Co., New York, 1907.

Gouley has compiled an excellent practical book, somewhat informal as to plan, but filled with knowledge gained only from a ripe experience. The first chapter is devoted to Catheters, Bougies, and Sounds. There is included in this brief résumé of the subject an excellent historical sketch. Other chapters in the book are Catheterism and its Accidents, Chronic Urethritis, Bulbo-urethral Adenitis and Orchitis, Retention of Urine during Urethritis; the Prostate, some of its Affections; Urocystitis, its Nature, Causes and Effects; Urocystitis, its Management; Lithotomy, its Early History and Modern Adaptations; Modern Lithotomy and Lithotrity. Other associated topics are discussed.

The author's extensive historical knowledge is well evidenced throughout the entire work. To those who work especially in these subjects and to the general practitioner the book will afford much that is instructive and directly useful in practice.

CORRESPONDENCE.

LONDON LETTER.

BY G. F. STILL, M.A., M.D.

During the past month an interesting discussion took place at the Clinical Society on the so-called congenital hypertrophy of the pylorus. There was little reference to the symptoms, which during the past few years have become well known. The vomiting, constipation, and wasting, associated with marked and visible peristalsis of the stomach and a palpable thickening of the pylorus, form so characteristic a picture in early infancy that once recognized there is little to be added to this description of the disease. The speakers therefore limited themselves almost exclusively to treatment, and the discussion was the more valuable as many who were not members of the society had been specially invited to be present. So keen was the debate that the question of prolongation or adjournment had to be raised, and eventually the meeting was prolonged, but even then many were unable to obtain a hearing. It is to be wished that such a state of things happened more often at the London scientific societies, where formality and politeness are too apt to stifle discussion.

Dr. G. A. Sutherland opened the proceedings with a paper on the medical treatment of this disease, particularly by lavage, associated with careful feeding, and in his opinion breast-feeding, peptonized milk (cow's), or whey were the most suitable foods. He did not believe that drugs were of the least value in this condition. Dr. Voeleker out of seven cases had five deaths, all after operation; the two recoveries were with lavage and careful dieting. Mr. Burghard had operated on 16 cases, of which 10 recovered; the operation done in all was forcible dilatation of the pylorus. Dr. Henry Ashby had come from Manchester by special invitation, and mentioned 11 cases, all of which had proved fatal; only one had been treated by operation. Mr. Dent made a strenuous defense of surgical treatment, but had to admit that about half the cases treated thus died; this he seemed to attribute to the fact that the cases did not reach the surgeon until they were already in a very advanced stage of the disease. Dr. Still's statistics showed recovery in more than half the cases (14 out of 23) under his own observations, and some of these, which were quite as severe as any cases he had seen, recovered under medical treatment alone; 8 were treated by operation (forcible dilatation of pylorus), 6 were treated by lavage and careful dieting (one case by dieting only). Dr. Cautley propounded a class of cases as (1) those with simple spasm of the pylorus with no hypertrophy; (2) those with spasm and slight hypertrophy; (3) those with great hypertrophy. This classification, which was supposed to explain the recovery of some cases without operation, was described by Dr. Hutchinson as a purely theoretical one, resting on no basis of fact. Out of eight cases treated medically under his observation only one had died. Dr. Hutchinson regarded surgical treatment as quite unnecessary in these cases.

This discussion drew forth some actual statistics of the results of treatment in this disease which were badly needed, for hitherto but few have been available for comparison; and it was clearly shown that however necessary operative treatment may be in some cases, it is certainly not necessary or advisable in all. The remarks made were in interesting contrast to those made when the same subject was discussed at the Toronto meeting of the British Medical Association, for the general trend of opinion was evidently much more favorable to medical treatment than formerly.

A meeting of a somewhat different char-

acter took place recently at the offices of one of the daily newspapers. It is not often that members of the medical profession in this country allow themselves to be drawn into newspaper offices—indeed, they are at some pains to avoid the ubiquitous reporter and all his kind; but on this occasion the matter in hand appealed to our profession so strongly that many leading members volunteered to give their support and Sir Thomas Barlow took the chair. The meeting arose out of a series of rather sensational articles written by Mr. G. R. Sims on "The Cry of the Children," in which he drew attention to the presence of little children and even infants with their drunken parents in beer-houses and drinking saloons. Sir Lauder Brunton, Sir Victor Horsley, Prof. Sims Woodhead, and a large number of distinguished physicians and men eminent in all departments of church and state crowded the hall, and spoke strongly in favor of legislation to prevent the taking of children into these scenes of drunkenness and vice. Some difference of opinion arose as to the exact age under which exclusion should be made compulsory; the general feeling seemed to be that no child under sixteen years of age should be admitted to any beer-house, but there was unanimous agreement among all those present—and all shades of political and religious opinion were represented as well as widely divergent views on total abstinence from alcohol—that the presence of little children, and indeed of any child at the school age, in a beer-house or drinking-saloon was an unmixed and dangerous evil, and a committee was appointed, including several of the best known physicians, to bring the matter before Parliament.

At the comitia of the Royal College of Physicians this month the election of president, which is an annual office, took place. The voting resulted, as was expected, in an almost unanimous reëlection of Sir Richard Douglas Powell to the presidency; and indeed any man who has performed the duties of president for one year thoroughly well deserves reëlection if he is willing to accept again the onerous duties which the post involves. He is the chief representative of the medical profession and medical learning in this country, and whenever advice is required on medical matters by the state, whether in royal commissions such as that now sitting on vivisection or on grave matters of state policy in regard to public hygiene, the president of the Royal College of Physicians is the natural person to consult; moreover, he must attend numberless committees and devote no small share of his time to the work of his high office.

A remarkable paper was read before the Royal Medico-Chirurgical Society recently by Dr. Raw, of Liverpool, in which he claimed that a bacteriological distinction was possible between human and bovine tuberculosis, and that certain forms of tuberculosis in man were usually due to the bacillus of the bovine disease, while other forms were due to a different bacillus. Thus tuberculous peritonitis and tuberculous meningitis were produced by the bovine infection, whereas ordinary pulmonary phthisis was due to the bacillus of human tuberculosis. If this should be confirmed by further observation it will be an unexpected corroboration of the famous views expressed a few years ago by Koch.

The death was announced a few days ago of Dr. A. E. Sansom, who was well known in this country as an authority on heart disease. He was for many years one of the physicians of the London Hospital, and also took a great interest in diseases of children. He was one of the earliest supporters of the Society for the Study of Diseases of Children, and I believe took the chair at its first meeting. He retired from practice about two years ago owing to failing health.